

JULY / AUG 1985

The Grape-growing & Winemaking Review

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The Grape-growing & Winemaking Review

PRACTICAL WINERY

JULY/AUGUST 1985

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PRACTICAL WINERY (ISSN 0739-8077) is owned and published by D.F. Neel. Editorial/Business Office: 15 Grande Paseo, San Rafael, CA 94903 (415) 479-5819.
Published bi-monthly at subscription rate of \$24.00/year. Outside the United States, please add \$8.00US sea mail; \$20.00US, air mail. Application to Mail at Second-Class Postage Rates is Pending at San Rafael, CA. Postmaster: please send change of address to 15 Grande Paseo, San Rafael, CA 94903. Back issues: \$5.00 prepaid. News media may use no more than 1/4 page of material per issue provided that PRACTICAL WINERY is credited.

*When the wines were good, they pleased my sense, cheered my spirits,
improved my moral and intellectual powers, besides enabling me to confer
the same benefits on other people.*

George Saintsbury

Letters

Dear Editor:

I was looking at the latest issue of Practical Winery; it is a very sophisticated magazine. I thought as I was looking at it, "This is the magazine I wanted ten years ago, one that deals with all the practical issues and aspects of winemaking."

I just really wanted to pass the thought along to you and congratulate you for having provided the industry with something it really has needed. I hope you feel the appreciation from the industry you deserve.

Sincerely,

Zelma R. Long, vice president/winemaker
Simi Winery
Healdsburg, CA

Dear Editor:

The PRACTICAL WINERY articles on wine contests (Jan/Feb 1985) deal with one of my favorite subjects. I was disappointed with Pat Howe's article. How could she handle such a venerable social and cultural institution as wine judging in such a cavalier fashion?

Bruce Rector's article is another matter. I enjoyed his behind-the-scenes insights. The trouble is, it left me with terrible, nagging questions. He suggested that it would not be advisable to enter delicate wines because of 'the drawbacks of palate fatigue'. If the judges suffer palate fatigue, how can they judge any wine effectively?

"The more a wine is European-like, the more likely it is to win." If judges favor European-like wines, wouldn't it be better if the L.A. County Fair judging were limited to wines from Europe?

"Ageing potential can only be used in deciding silver from gold medals." What is the reason for such a restriction?

The judges' first goal was 'to serve the consumer with our medal recommendations'. How could the judges be sure there was any relationship between their recommendations and actual consumer preferences?

Regarding possible wine vapidness: "The dominant personality does not get his/her way." Regarding possible vegetativeness in wine: "An individual can totally bias a panel." Why is this allowed to happen in the latter instance and not in the former?

"Very small amounts of it (sugar) in a 'dry' class help soothe the fatigued palate and keeps the judge coming back to the wine." Should a winery put a little sugar in its Cabernet Sauvignon for this purpose, even if it means having to sterile-bottle it or add sorbate?

"Entrants stay with the trends..." Would the L.A. County Fair consider publishing a list of what wine trends will be two or three years hence, so the prospective entrant will know what to do with this year's grapes?

"Keep your acidity up, but not to the point where it could aggravate a fatigued (judge's) palate." Could the fair provide this information in ppm as tartaric? If the winemaker caters to the judges' fatigued palates all of the time, may he not

do so at the expense of the consumer, whose palate is usually *not* tired when he drinks wine? How can this conflict be resolved in light of the stated purpose 'to serve the consumer with our medal recommendations'?

"Enter the best bottling." It's nice for the chairman to suggest this, but how is one to know which is the 'best' bottling if both are not entered? If the winery, or consumers for that matter, are able to tell the 'best' wines entirely on their own, why do we need wine contests?

"It is fun to win a medal, even if it is in an obscure class." Should the anticipation of 'fun' be the reason why a winery should enter a judging? What is a good reason?

"Bronze and honorable mention means that you made an outstanding wine. Give the same wine to a different panel on a different day and you might have received a silver or maybe a gold medal." And "You are just as likely to enjoy a bronze or honorable mention wine as you would enjoy a gold or silver medal winner." If the above is true, why go to all that trouble to decide exactly which wine should win which medal?

"It seems that the reason the granddaddy of the fairs is around today is that it does better the breed." How can a wine judging process, which seems to present so many problems, better the breed? Could it be that the reason that the 'granddaddy of the fairs' is still around is that so many fine wines are being made today, and not the other way around?

I have to stop. It's getting too painful. Besides, some of my questions are now starting to suggest more questions to me. I have been thoroughly disillusioned by Bruce's article. I used to be the first on my block to get the latest magazine with the latest wine-judging results. I didn't care if it *did* cost \$6. There is simply nothing like the thrill of drinking a gold medal wine, and having that *solid gold* feeling that you're drinking *the best*. Now, how will I impress my friends? Is there life after wine contests?

Maybe if one of the more intellectual wine writers would take it upon himself to write a thorough philosophical, psychological, and economic analysis of the wine contest syndrome, it would help me to face up to the truth. While I'm waiting for that to happen, I think I'll call some of my wine-drinking friends and see if they would be interested in starting a chapter of W.C.A. That's *Wine Contests Anonymous*. Gee, I wonder if Bruce would like to join?

Regards,

Dave Caparone, owner/winemaker
Caparone Vineyard, Paso Robles, CA

Dear Editor:

Kudos to you and your increasingly sophisticated publication for the sterling Sauvignon Blanc coverage in the May/June 1985 edition. Obviously, we appreciate the chance you afforded us to get our word out; but, more particularly, we thank you for your strong implied support of Paso Robles as an outstanding site for premium Sauvignon Blanc production. By choosing *two* wineries from this appellation (Creston Manor and Martin Brothers), that subtle but unavoidable message was made most effectively.

Sincerely,

Nick Martin, co-owner/winemaker
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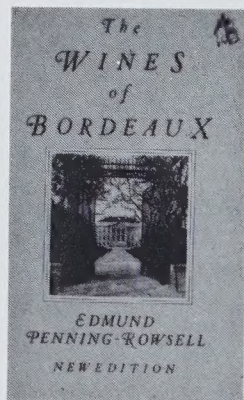
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Free Run

Diane Mayfield

Wine is experiencing an identity crisis. Is it, as the spirits industry claims, simply 'beverage alcohol', a product little different from beer or hard liquor in that they all contain ethanol? Or is it, as the wine industry suggests, a unique product, a moderate social beverage to be drunk with food?

Answers to these questions are crucial to the wine industry. Until this industry provides a clear, unique, and, most importantly, widely recognizable identity for its product, wine will continue to be lumped together with beer and spirits as 'demon alcohol'.

We in the industry know that wine goes with food and that it is the beverage of moderation; goodness knows we spend enough time telling each other this. But attempts by individual wineries to attract people who already drink wine, rather than build a recognizable identity for the product as a whole among those who are not yet wine drinkers, are dangerously shortsighted. Without such an identity, the industry is left wide open to those who wish to identify wine with their product, possibly to the detriment of wine's image that the industry would like to promote.

Thus Seagram's can claim 'equivalency' among beer, wine, and spirits based on their ethanol content. It is true that there are roughly equivalent amounts of alcohol in 12 oz. of beer, 5 oz. of wine, and 1¼ oz. of spirits. But this argument, of course, begs the question, since it is based on the erroneous assumption that equivalency of amount equals equivalency of effect. We know, for instance, that blood-alcohol rises quicker and higher with spirits than with wine.

The wine industry, however, has never bothered to publicize the facts concerning equivalency (or lack thereof) of the effect of alcohol in beer, wine, and spirits until goaded by Seagram's into so doing. In fact, the Seagram's equivalency ad may prove a boon to the wine industry in that it is finally forcing the industry to produce a clear and separate identity, something wine has needed all along in order to broaden its per capita consumption base in this nation.

Seagram's apples-and-oranges comparison of beer, wine, and spirits points up the danger of failing to produce a clear-cut identity. Seagram's lumps all three beverages under the umbrella term 'beverage alcohol'. This term, of course, directs attention to the only two qualities that wine has in common

with beer and spirits; all three beverages contain alcohol, and they are all wet. The term effectively ignores the unique features of wine that set it apart from beer and spirits.

If the wine industry seriously does not want Seagram's to determine what wine is and what it isn't, then it's time this industry start spreading the word about the unique properties of wine. Two important steps in that direction have already been taken.

In 1978, the Wine Institute in California published a 'Code of Advertising Standards', a set of voluntary guidelines for advertisements adhered to by member wineries. The Wine Institute has already been commended by the US Senate for this act of social responsibility. With the current controversy over beer and wine ads on radio and TV, it would be well for the wine industry to broadcast this fact, thus emphasizing on a national basis wine's image as the beverage of moderation.

Formation of the Winegrowers of California is the second step. This group has the potential to determine and spread wine's unique identity on a national basis. By conducting wine education programs throughout the country, Winegrowers can present wine's image to an increasingly diverse population. Actually convincing a wide cross-section of the population to accept wine as a mealtime beverage is an important lesson. Winegrowers of California could also point out the support for wine as a healthful beverage by medical authorities.

Individual wineries are also beginning to make an effort to promote wine nationwide as a moderate social beverage that goes with food. Going on the theory that if Mohammed won't come to the mountain, then the mountain must go to Mohammed, groups of vintners from Washington and from Napa and Sonoma in California make annual trips to cities across the nation, holding educational seminars and tastings for consumers and press. And some wineries, notably McDowell Valley Vineyards, offer the public excellent advice (in the form of well-written booklets) on food and wine pairings and ideas for cooking with wine.

This is a start, but only just. The wine industry needs to do much more to associate wine with meals and social responsibility. Possibilities exist everywhere, from convincing restaurateurs to provide written wine recommendations next to the entrees on the menu to teaming up with MADD in a crack-down on drunk driving. Whatever the program, wine needs to assume and maintain a clear, unique identity among a broad base of the nation's population. C'mon, wine industry—it's time America knew the *real* facts about drinking.



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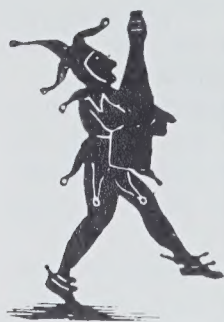
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In The Cellar

Jake Lorenzo

(Editor's note: Jake and I were sampling some wines with Bob Sessions over at Hanzell Vineyards when I asked Bob which wines were his favorites. Jake hit the roof! He pulled all the coins out of his pocket and started throwing them at me . . . HARD! Then he shouted, "They're all his favorites, you don't rate your children." Then he and Bob went out for a shot of tequila.)

I became a private eye in college. I was more visibly radical in those days and learned some powerful lessons that were to influence the rest of my life. The most succinct lessons were administered by the numerous police officers who kept dragging me off to jail at the slightest provocation.

In fact, it was on the day of my first incarceration that I learned my most profound lesson. "Time is the coin of life, take care lest others spend it for you." Carl Sandberg wrote that, and punctuated by the slamming of a cell door, I took it immediately to heart.

I got me a great bail bondsman, known to us regular clients as 'Lips'. Lips afforded me the luxury of freedom, for a price of course. And with that luxury I became a private eye because as a profession it allowed me to invest time as I pleased.

I've dredged up all this past history to discuss my theory of child rearing. My daughter Jacklyn has been a great source of pleasure and frustration. Her mother and I have pretty much played raising her by ear, but early on we did make one major decision.

It is thought, by those who spend life's coins investigating such things, that children learn the patterns with which they will view the world around them at a very early age. By the time a child is four or five, about 90% of the way they will relate to their environment is set.

This has always made sense to me, so the only conscious child-rearing decision we made was to be around Jacklyn those first critical years. To that end, I didn't work much. We stayed around the house and went to the beach and whenever we got some cash we would travel as far as we could for as long as we were able.

The theory here was that if we provided a safe, solid, loving environment for Jacklyn, while at the same time exposing her to exotic, strange, wonderful visions of the world, she might grow up to accept the unique differences of others. She could view them, not with fear or suspicion, but with fascination. She could then make honest judgements about her actions.

The first four or five years are critical to establishing the framework from which the child will explore the world. The next ten years are almost as important. These are the years when the child tests out the environment around her. Using the patterns learned the first years, she moves about and extends herself into the world in an attempt to discover her place in that world.

A loving, secure environment is essential during this stage

of development, as well as a watchful eye. The parent needs to allow the child to develop slowly in their own way according to their own patterns, but the parent must step in when disaster is possible to protect the child. Knowing when to step in and when to let the child work it out alone is the secret to good parenting.

Adolescence is the time of independence. It is often a messy disjointed phase. The child must cast off that lifetime of watchful security and strike out on their own. Often the combination of excitement and insecurity with regard to taking responsibility for one's own actions makes for some strident times. The rule here for parents is HANDS OFF. The patterns of dealing with the environment are set. The experience of dealing with the world is learned. Be patient and let this new person develop on their own.

Finally, they are no longer children, but adults. They are on their own to make of themselves what they will, but if we look carefully, the markings of childhood are obvious and provide a connecting thread throughout their life.

Obviously, aside from spending many of my coins on child rearing, I use a great many imbibing wine and a few other selected beverages. In fact, I sometimes receive a pittance of cash for writing such as this . . . if they pertain to wine.

By now I'm sure all of you see the connection.

Winemakers, cellar rats and vineyardists are the extended family of fine wines. They nurture wines through their birth, childhood and maturation into adulthood.

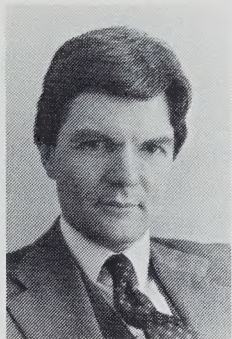
For wines, just as for children, the earliest stages are the most critical. Vineyard practices, vintage and fermentation techniques lay an undeniable personality on any given wine. If vintage and fermentation produce a wine that is light and fruity, no amount of guidance or pressure will successfully turn that wine into a powerful, tannic monster. In a hot vintage, with very ripe fruit and high sugars, and no room in the winery to work with the juice, the wine will probably be big, alcoholic and rough, no matter how you try to soften it.

The secret lies in determining the possibilities, the distinct personalities and then providing the technique and security of environment to allow them to develop to their fullest. The mistake is to try and force them to become something they're not. For this reason each vintage, as well as each variety must be treated differently, with respect for their individual characteristics.

The second stage of wine development involves storage, blending and barrel ageing. Here, the winemakers and cellar rats must be diligent to watch for disasters. Bacteria, yeasts, oxygen, leaking valves, dirty hoses and careless attitudes all represent dangers that can destroy a delicate young wine. The wines need to develop on their own, but we must step in to protect them from outside disasters.

Wine adolescence is bottling. The changes can be drastic. That sweet, lovely, lively wine can become sullen, morose and dull. Remember, HANDS OFF. By this time it's out of your hands. The parenting is done. Sit back and ride it out and see what develops. If you've done your job by creating a warm, healthy environment, if you've protected the babies from disaster and allowed them to develop in their own way; then you have nothing to do but take joy in the fascinating adults they are about to become.





The Wine Lawyer

R. Corbin Houchins

Market Intervention

In an earlier column (PW Nov./Dec. '84) we considered some methods for a small winery to cope with 'price affirmation' requirements of buyers. Affirmation is in the news these days, so it seems worth looking at recent developments.

If you have an important market in an affirmation state, the straws in the wind could portend concrete changes in your ability to price promote elsewhere. Even if affirmation does not immediately affect your business, it provides a good basis for considering the impact of government intervention in the marketplace—a subject that affects the business planning of everyone in the wine industry.

What Is Affirmation?

At bottom, affirmation is simply a sales contract term under which the seller warrants to the buyer that a price is not higher than the lowest sales price of the product offered to any other buyer.

Anybody can use affirmation. Next time you order bentonite, there's nothing to prevent your asking whether the price charged to you is the lowest price charged anyone else in the past six months and refusing to do business unless you receive an affirmation that it is.

You probably won't get very far—but that is because you do not have a monopsony (which in antitrust parlance is the buyer's version of a monopoly). If you were by law the only person in the area allowed to purchase fining materials, you would very likely get a different response.

Origins

Affirmation clauses are sometimes called Des Moines warranties because their vogue in the liquor industry began at a postwar meeting of monopoly state bureaucrats in Iowa. Historical precedent can be found in federal government procurement contracts, where affirmation clauses were introduced to cure corruption or incompetence on the part of buyers. If the buyer were prevented from making a deal at a sweetheart price, the theory went, then there would be no incentive to bribe or to kick back part of the purchase price.

In the liquor industry the real impetus for the Des Moines warranty was more economic than moralistic. Whiskey prices, it was thought, would in fact be lower, so the state would have a broader margin in which to stick its markup without increasing retail prices to the point of drying up sales. Soon the wholesale tier of the licensee system began importuning legislators to write price affirmations into private sales contracts with their suppliers. The practice was extended in some states to beer and wine, and for a time affirmation appeared to be part of the pro-consumer trend.

Disappointment

Currently affirmation is widely regarded as having sounded great at the time but proven a lemon in practice. In 1985 alone, New Mexico repealed its affirmation law and Washington enacted a law directing its liquor board to discontinue the practice, which it had adopted without explicit legislative sanction. Affirmation measures in other states are under attack in the courts and legislatures.

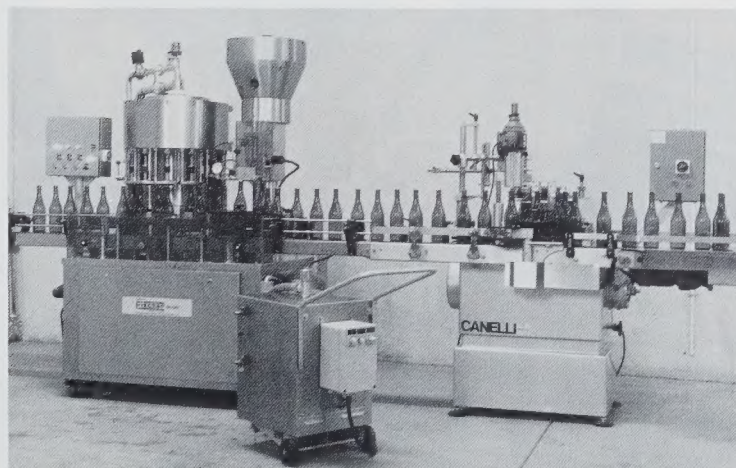
Economic Reality

Failure of affirmation to work as planned is not difficult to understand with a little hindsight and some basic economics. If you sell nationally, you face a variety of market conditions.

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In those markets where you must initiate a low price to enter and gain share, or respond with a low price to meet competitive challenges, your margins will be low. To stay in business, you must maintain normal margins in markets where competitive conditions permit.

An intensely competitive high-volume market gets lower prices, and no bureaucrat can make a less competitive market—as monopoly states tend to be—command competitive prices simply by saying it has to be so. A rational seller who has to sell a product on a thin margin in a vital market will simply not offer it in markets which don't justify the low margin by their volume but where monopsonistic buyers demand price warranties.

Instead of the high-demand product, the affirmation state gets a somewhat different item, one that is blended for the affirmation states and therefore necessarily lower in volume and higher in margin. Primary result: fewer choices for consumers and higher prices. Secondary result: harm to any wineries located in the affirmation state, as they are deprived of a stable 'heartland' market while they price-promote to gain share elsewhere.

Broader Lessons

What the affirmation story illustrates is the ease with which the bright ideas of bureaucrats can become law in our industry, supplanting the operation of normal market economics. Wineries share with munitions makers the peculiar distinction of operating in a socialist economy, the main difference being that the public servants who deal with our industry have no particular interest in preserving its profitability. The

historical reasons have to do mainly with long-standing awareness of the social cost of beverage alcohol (beginning long before Prohibition), combined with the lack of any distinction in the public mind between one form of booze and another.

Entrenched private interests seeking protection against competition and public servants seeking increase in the size of bureaucratic domains have extended the role of government. In consequence, every winery that must actively market its wine to attain its business objectives is affected by certain relatively anonymous people's notions of what seems right, serves an 'orderly market' or prevents 'excessive' sales.

Business Implications

That state of affairs has three practical effects on your business.

First, innovative marketing is discouraged. To use even so common a packaged goods marketing method as coupon refunds one may have to engage in a running battle with regulators to vindicate the right to do so in a state without an express prohibition. Your incentive to experiment and find creative ways to compete is reduced.

Second, licensees in specific categories are perpetuated by law, irrespective of their economic contribution. In effect you pay a toll for passing government-mandated gates on the way to market.

Finally, the status quo creates and exacerbates discontinuities in normal growth curves. A company has to have a certain size to deal effectively with a mandated middle tier, with local restrictions on advertising and promotion and with the patchwork of state importation requirements. There is probably a gap between your present volume and your optimum volume, one that would be much easier to cross if laws were less numerous and more uniform.

Self-Interest

One cannot say that those effects are bad for all producers. A given winery may prefer things just as they are, to lower the general level of competition somewhat or at least channel it in ways that are now familiar. It is a familiar phenomenon in manufacturing generally: executives profess strong attachment to the principles of free enterprise, but raise no real objection to regulations and statutes that require playing the game in the way they already know.

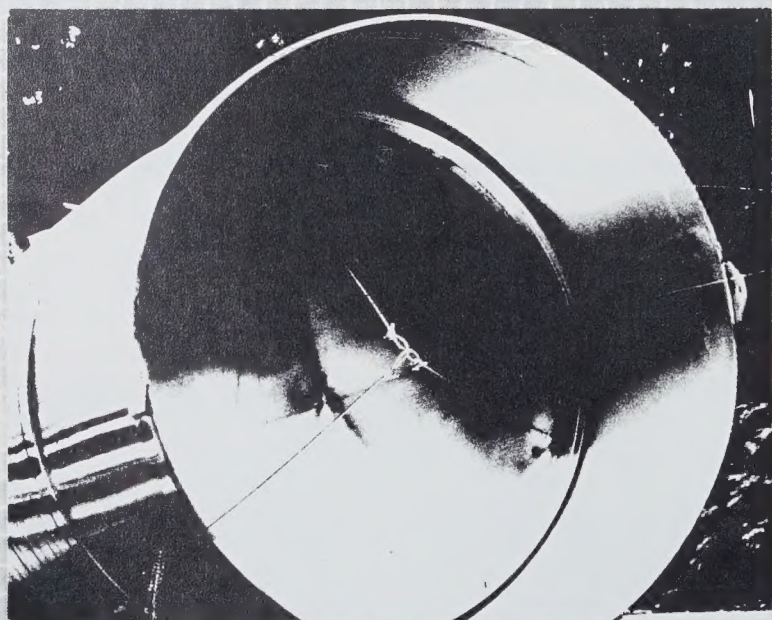
Nonetheless, one suspects that our industry would be better off as a whole and that more consumers would experience the pleasures of table wine with no increased social cost if the basic economic policy of the United States—i.e., relatively unrestrained competition—were applicable to wine.

Forces of Change

As economic pressure to compete more effectively increases, people become more ready to challenge old patterns. In the next column we will look at the prospects for collision between the regulatory structure and current developments in more direct methods of reaching the consumer.



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Richard Crichton

Estate Planning

(Editor's note: The following discussion of estate planning for wineries and vineyards was prepared by Greg Scott and Greg Tully of Price Waterhouse, San Francisco, CA.)

Many tax practitioners, with tongue-in-cheek, will advise clients that death is one of the most effective tax planning strategies. Although true, taxpayers should not identify estate planning solely with post-mortem consequences.

Despite the fact that the 1980s have brought about unlimited marital deductions for transfers to a spouse, and substantial increases in the amount of the taxable estate excluded from taxation (presently at \$400,000 in 1985 and scheduled to increase to \$600,000 for 1987 and later), tax planning is still essential for many estates as the maximum estate tax rate is 55%.

By its nature, estate planning concerns the transfer of a taxpayer's assets and the minimization of taxes to either the estate or to all prospective heirs upon such transfer. Taxes include the estate tax (basically imposed on the fair market value of assets in the estate subject to certain deductions and exclusions), gift tax and income tax.

Closely-held winery operations are generally well-suited to careful estate planning. The business is often the principal asset in the owner's estate, and tax considerations can often be molded to adapt to overriding family and business goals. An important point to recognize is that estate planning techniques are not designed only for the death of the taxpayer, but can be important in designing the most appropriate goals for retirement or ownership change in the business also.

Three widely accepted estate planning techniques particularly suitable to the closely-held winery are recapitalizations, buy-sell agreements and self-cancelling installment notes/private annuities. This is by no means an exhaustive list of planning techniques, but representative of the methods recommended by practitioners. The following explains each of the techniques in greater detail; however, it should not be surprising to note that each technique is subject to numerous, subtle modifications to most appropriately tailor it to a particular taxpayer's situation.

Recapitalizations

A recapitalization is often synonymous with the term 'estate freeze' whereby the present owner can lock in a current value of the business for estate tax purposes and allow any prospective appreciation to benefit hand-picked successors. This technique is also appropriate for maintaining a current income in retirement and specifically earmarking which individuals will eventually assume control of the business.

Typically, a recapitalization involves the exchange of presently held common stock for two new classes of stock: voting preferred and voting or non-voting common. The current owner receives the preferred stock and the common stock is gifted to individuals whom the taxpayer desires to take eventual control of the business. The preferred stock, by its characteristics, should reflect virtually all of the current value of the corporation. By doing so, the common stock, with minimal current value, can be passed along to children, for example, with minimal gift tax consequences.

Since the preferred stock is tied to the present value of the corporation and by its terms will not participate in future growth in value, an estate freeze takes place. When the

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taxpayer dies, his estate will include only the preferred stock which is valued at the value established at the time of the recapitalization. Thus, the appreciation of the business, subsequent to the recapitalization, is not subject to estate tax as it is associated with the common stock held by other shareholders.

Example 1

Taxpayer X, the owner, is ready to phase out of the daily winery operations and wishes to have his son, A, and valuable (but unrelated) long-time manager, B, control the future destiny of the company. The company issues voting preferred stock to be exchanged for the current common stock held by the taxpayer and simultaneously issues a new common stock at the time the winery has a value of \$1,000,000.

An independent valuation sets the value of the new preferred at \$980,000 and the new common at \$20,000. The preferred has a cumulative dividend rate of 10% which will maintain current income for the taxpayer. He gifts $\frac{3}{4}$ of the voting common shares to A and the remainder to B without any gift tax and minimal compensation income tax consequences.

Ten years later, the winery is worth \$2,500,000. The growth in the company since the recapitalization is reflected in the increased value of the common stock and the taxpayer's preferred stock retains a \$980,000 value for potential estate tax purposes.

Structuring an estate tax freeze is not without its pitfalls. Care must be taken to genuinely associate all of the value of the business at the time of the recapitalization with the preferred stock, or the gift of common stock will indeed create gift tax problems. The preferred stock should therefore have such features as voting rights, and, if possible, pay dividends (cumulative), be competitive as to a dividend rate with comparable publicly traded preferred stock and be able to justify such dividend features based on a present and anticipated earnings ability. The preferred stock should have a liquidation preference feature which can realistically be met. The ability to convert the preferred stock back into appreciating common stock may help support a substantial valuation.

Another pitfall of recapitalizations involves what is known to tax practitioners as 'Section 306 stock'. This phrase is derived from the part of the Internal Revenue code which basically indicates that if preferred stock meets certain tests, and is sold or redeemed, ordinary income may be generated rather than more favorable capital gain treatment. The taxpayer/shareholder in a recapitalization can avoid the potential ordinary income treatment with some careful planning. The most straightforward is to simply hold the preferred stock until death, as the tax law indicates that when preferred stock is passed onto the estate or heirs, it is free from the ordinary income taint of 'Section 306 stock'.

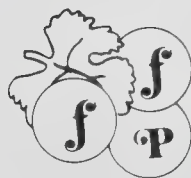
Circumstances may arise, however, in which the taxpayer wishes to sell or redeem his preferred stock or portions thereof prior to his death. In such cases, if the taxpayer

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either gifts the stock or redeems the preferred stock during a liquidation of the corporation, the ordinary income treatment will be avoided. Also, if the taxpayer due to the structure of the recapitalization also holds common stock, then the Section 306 consequences can be avoided by selling all of his common stock to an unrelated third party or redeeming all of his common and preferred stock, completely terminating his interest in the corporation.

The recapitalization technique is also applicable to wineries operated by a partnership. The technique involves two types of capital interest in the partnership, one with a preference to capital and income and the other having an interest in subsequent appreciation.

Buy-Sell Agreements

While a buy-sell agreement is not always as effective as a recapitalization in limiting the closely-held business value for estate tax purposes, it can make such valuation for estate purposes definitely determinable. Without similar planning, the executors of an estate could face a substantial liquidity crisis and/or have a potentially costly disagreement with the Internal Revenue Service (IRS) with respect to the appropriate estate valuation of the business. Buy-sell agreements can ensure liquidity to the estate and be a useful tool in determining future ownership of the business.

In simple terms, a buy-sell agreement is an arrangement whereby at the occurrence of a specified event(s), the buyer is obligated to purchase and the seller (or his estate) is obligated to sell at a price determined by the terms of the agreement. In order for parties who might not otherwise have liquidity to fund such a purchase, life insurance is frequently used as a funding vehicle.

Perhaps the most difficult and important step in structuring a buy-sell agreement involves the determination of the eventual selling price. If the selling price of the stock is appropriately determined, then it stands a good chance of resisting possible challenge from the IRS.

Example 2

Taxpayer, a 60% owner, enters into a buy-sell agreement with other shareholders (and vice-versa) giving them a right to purchase his winery stock based on book value at the date of sale. The mutual agreements prevent any shareholder from disposing of his interest without providing the existing shareholders with a right of first refusal.

Five years after the agreement is executed, the taxpayer can still accurately estimate potential estate tax liabilities, the cash inflow upon sale and the liquidity available after paying estate taxes, based upon 60% of the then book value. Also, he can be assured the winery will likely remain in the hands of the other owners at the time of his death—the same individuals with whom the buy-sell agreement was executed years earlier.

Many techniques for establishing the selling price of stock of a closely-held business are available. Textbook examples would include such methods as capitalizing earnings or basing the price on a book value. For a discussion of valuation techniques, you may refer to the Winery Finance column in *PRACTICAL WINERY*, Nov/Dec 1984 (page 14).

Establishing a reasonable selling price, by itself, does not ensure the validity of a buy-sell agreement in the eyes of the IRS. Additionally, the agreement should have a valid business purpose (which fortunately can be as simple as a desire to keep control of the business within the family) and there must be an obligation to sell at the stated price anytime after the agreement is made. It will not suffice to have an established selling price which becomes valid only upon the death of the major shareholder but is of no consequence, for exam-

ple, three years after the agreement is in force.

Many variations can be used in drafting a buy-sell agreement. It can be structured to require the company to buy back the outstanding shares or there may be a requirement that other shareholders are obligated to purchase the stock or at least have a right of first refusal.

As discussed above, buy-sell agreements generally will not be as effective as recapitalizations in locking in a current value for estate tax purposes. However, the agreements are effective in maintaining the desired control over the business entity and, if properly structured, lessen exposure to potentially adverse estate and gift tax consequences by virtue of the arrangement.

Self-Cancelling Installment Notes Private Annuities

A private annuity in the context of a sale of a closely-held business involves a transaction where the present owner will transfer the business in exchange for life-time payments. From an estate-planning viewpoint only, this method has the feature of being excluded from estate tax as the ability to receive payments ceases at the annuitant's death.

From an income tax perspective, the private annuity is much like its counterpart sold publicly by insurance companies in that a portion of the payments received are considered return of capital and the remainder is considered to be either capital gain and/or ordinary income, depending whether the annuitant has outlived his actuarial life expectancy.

Example 3

Taxpayer, the sole shareholder in a million-dollar valued winery, no longer wishes to be involved in the business after his 60th birthday. In average health, with a concern about post-retirement income, he wants a steady cash flow for extensive travel plans and to maintain a lavish residence purchased several years prior. The buyer, after assuming existing liabilities of the company, agrees to pay the former owner \$11,000 per month for the remainder of the prior owner's life. Given he had a tax basis in the winery of \$400,000 at the time of sale, \$1,800 of each payment until shortly after age 78 would be a non-taxable return of capital and the remainder, capital gain in part and ordinary income in part as determined by IRS life expectancy tables. Thereafter, all amounts would be ordinary income.

At the death of the prior owner, there would be no value of the payment stream included in his estate as it ceased at such time.

There are two principal drawbacks to the concept of a private annuity. Although it works well from an estate planning perspective, there may be undesirable gift tax and economic consequences to such an arrangement. If the present value of the annuity is less than the fair market value of the business transferred, the original owner may be subject to a taxable gift. From a purely economic standpoint, if the annuitant should outlive his anticipated life expectancy, the purchaser of the business will ultimately pay a greater amount than originally anticipated. Assuming the business was sold to a family member/relative, this could be an undesirable result. This risk could be anticipated through the purchase of an annuity from a life insurance company commencing when the individual reaches age 78.

Self-Cancelling Installment Notes

As a solution to some of the problems of private annuities, some tax practitioners have advocated the concept of self-cancelling installment notes. The self-cancelling notes have terms for a fixed number of years which is subject to cancel-

lation if the seller should die before the end of the established period. This enables the purchaser of the business to establish a total cost at the time of the purchase and avoid the actuarial uncertainties of a private annuity. Also, unlike a typical installment obligation which would be included in the gross estate to the extent of the value of the obligation of future payments, a self-cancelling note is not part of the seller's estate as payments cease upon death of the seller.

The 'cost' associated with a self-cancelling installment note involves a 'risk premium' which must be reflected in either the original sales price of the business or the interest rate on the note. If the risk premium is not determined appropriately, and donative intent is shown, there is potentially a taxable gift.

Example 4

Assume the same facts as Example 3; however, the owner is in great health and the sale is made to a nephew devoted to the business. Given a concern for the potential of the nephew 'over-paying' for the winery, a self-cancelling installment note is used in lieu of a private annuity.

The note with interest at 14.5% requires payments for the lesser of 10 years or until the prior owner's death. In developing a risk premium, the sales price is adjusted from \$1,000,000 to \$1,300,000. The monthly payments are adjusted to \$20,500 per month as consideration for the upper limit on the number of payments to be made.

Both the self-cancelling installment note and private annuity have sound features as estate-planning tools. Where the seller lives beyond his/her anticipated life expectancy, the self-cancelling note is more advantageous than a private annuity; it is in the instance where the seller dies prematurely that the private annuity has more favorable tax consequences.

Self-cancelling installment notes additionally have income tax considerations. For example, if the notes are between related parties, adequate interest (presently 14.31% for notes longer than nine years) must be stated on the note to avoid imputation of interest under the below-market interest rate provisions of the Internal Revenue Code.

Analysis of a self-cancelling installment note versus a private annuity clearly points to the fact that in most instances, estate planning must examine factors beyond the estate tax itself.

Overall Tax Analysis

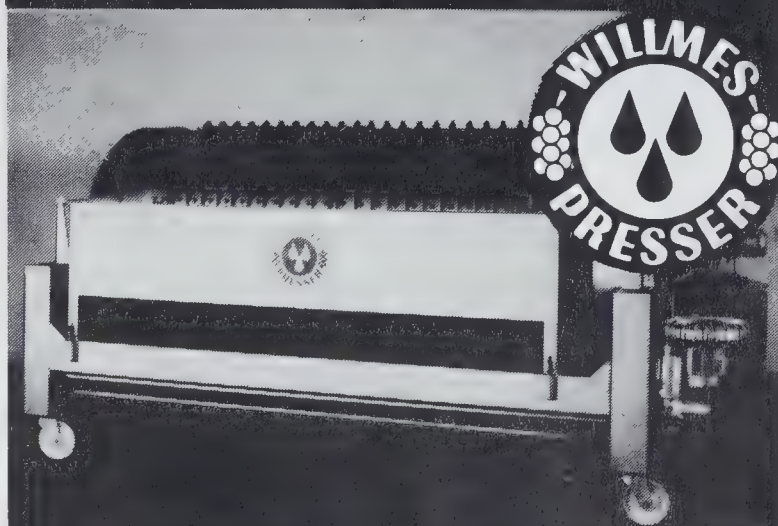
In determining the most advantageous estate planning technique, other tax considerations must also be examined. The impact of income taxes or gift taxes may ultimately dictate the most appropriate estate planning method. Not only should the tax consequences to the seller be considered; if a closely-held business is to be sold to a family member/relative, then the entire family tax consequences should be considered.

If the ultimate goal of estate planning is to lessen the overall tax consequences for the spouse and future generations, then a 'big picture' approach must be used. Whether techniques such as recapitalizations, buy-sell agreements, self-cancelling installment notes or private annuities are to be used is dependent upon careful analysis of the particular circumstances and goals of the closely-held business owner.

(Editor's note: Future articles on estate taxes will address how to defer payment of the estate taxes on the value of a closely-held business and special use valuations provisions.)



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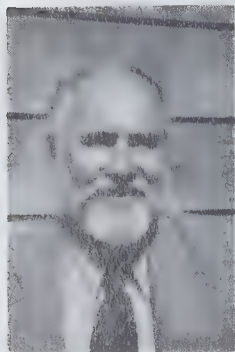
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Water Supply and Wastewater Treatment System Operation & Maintenance Tips

Psyching-Up

It seems only yesterday that the 1984 grape harvest came happily to a close, yet here we are again, facing the winemaker's equivalent of the 'Iron-man Triathlon'. If the weather cycle for the 1985 season is favorable and the grapes do not all ripen in the same 30-day period, maybe there will be enough fermentation capacity this time to make it through the crush at just a sub-frantic pace (certainly not a leisurely pace . . . there never is), without requiring Mach III, the standard working velocity in unforgettable 1982.

With market projections still not bullish and shelf space harder than ever to achieve, getting mentally, emotionally and physically psyched-up for the crush each year takes a concerted effort. Terror and financial survival are two essential ingredients in my self-motivation.

Whatever your motivation as you begin to evolve a 'crush plan', please include a preventive maintenance (PM) section for your waste treatment system and water system and all of their critical components. The plans should include electrical continuity and mechanical checks for the crusher/stemmer, press, assorted pumps—for without those wonderful devices in top working order, your crush would be a flop. This same kind of attention should be given to your water supply and wastewater system works because they become painfully important when they're not working.

Peak Load Factor

During the crush period all of the process water and wastewater system elements will be working at near (or maybe even above) their rated capacities.

One simple approach in beginning your PM program is to identify the *critical system components* and take a hard look at their relative reliability factors during the abnormal period of hydraulic and solids loadings that typify the crush period.

For example, if you begin to trace the wastestream from the crush bay downstream you find a rotary drum screen—critical or non-critical component? If the screen blinds itself, what are the consequences? Seeds and skins will bypass the screen and, except for the fact that more solids will reach the primary treatment element (pond, septic tank, aerated lagoon, etc.), the system will still function and not create a nuisance or a potential water pollution law infraction.

Continuing from the above example, assume that the next element in the system is a sewage lift station or pump station. Giving it the criticality test, logic should place this subsystem definitely in the critical category. If the pump station fails and no gravity bypass to emergency storage exists, the wastestream would either back-up into the winery or the pump station wet-well would overflow.

This part of your wastewater complex definitely needs maintenance scrutiny with some thought given to making that component more reliable by installation of key, duplicate mechanical/electrical parts or, at the very least, the stocking of those items, so that repairs can be made swiftly, if a malfunction does occur.

Preventive Maintenance

The military establishment has been the butt of jokes recently regarding its purchasing practices, and it does seem unbelievable that hammers are bought through Department of Defense procurement methods for \$700. One thing, however, that the military does very well is to maintain equipment in its optimum operating condition. To that end they have produced, among other things, very detailed maintenance manuals. Generally, if recommended programs are followed, a piece of equipment performs as well as it should. (I

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have a number of navy stories that could illustrate that exceptions to the 'good PM' rule do exist.) The old axiom—if it's mechanical or electrical it is bound to malfunction sometime—is probably well supported by probability theory. All that PM can do is give you better odds.

Pre-disaster Reference

The commercial equivalent of the military's *maintenance manual* is the so-called operation and maintenance (O & M) manual. If the winery truly wants to minimize down-time for its water supply and wastewater treatment and disposal system, the O & M manual is a good place to start. Your organization may already have such a document, and whether you realize it or not, you are well on your way to a systemized approach to facilities management.

For small wineries with systems on the low side of the technology scale (wells, booster pumps, septic tanks, leach-fields and oxidation ponds) all your O & M manual will require is a 3-ring binder with the following items:

- 1) Good 'as-built' drawings of the system with all the key plumbing features described and located (preferably simple reference points that would permit a laborer to locate a shut-off valve, cleanout or manhole.)
- 2) If mechanical/electrical equipment is involved, attach the manufacturer's operating instructions with wiring diagrams, spare parts lists, etc., and warranties if still valid.
- 3) Location of special tools such as a plumber's snake, valve keys, emergency lights and spare parts.

4) Telephone numbers (shop and home because mishaps always occur at night or on holidays) of key repairmen, with back-up help if the first-choice individuals are not available.

5) Check-list of periodic maintenance items and programmed dates each year for accomplishment of the task. For example, prior to crush, say August 1, have all septic tank septage pumped. Include a place on the checklist for the responsible person to initial and date when the task was completed.

Your own winery system needs can suggest other items that should be included in the O & M manual. A critical system component should have a *repair history* included in the manual so that chronic problems like bearing failures can be recorded and anticipated. When you leave to become assistant winemaker at Chateau Lafite-Rothschild, your successor will be happier to read about quirky equipment rather than face it the first time with an unwanted malfunction during the peak of the crush.

Wastewater systems and water systems which are 'higher-tech' are going to require a more elaborate O & M document, although the essential content for both will not be greatly different from that described in items 1-5 for the 'low-tech' system. For the more sophisticated systems, the design engineer should include in his contractual services the cost for preparing an O & M manual.

System Performance and People

Like most institutions with a profit motive, a winery generally works with fewer, but more highly qualified individuals,

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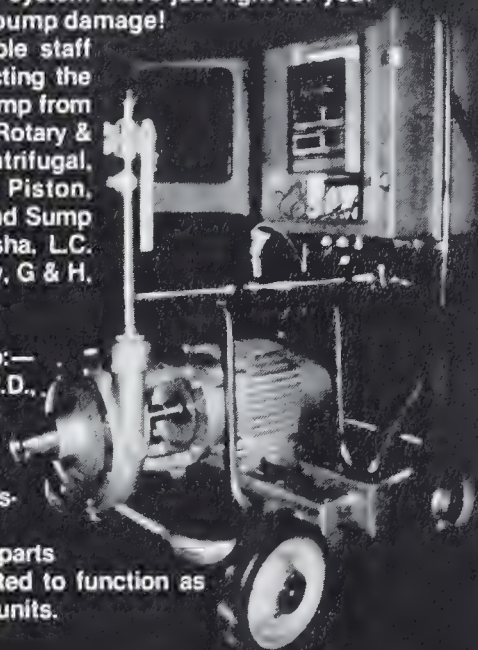
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both technical and non-technical, to get the job done. If the maintenance tasks which have been highlighted in this column can't be done because of a lack of qualified people, the principle of systemization of facility management falls flat on its face.

Fundamental human factors like motivation, supervision, working conditions, absenteeism and—last, but not least—pay, all go toward creating morale. The mariner's cliché of 'a happy ship is a well-run ship' is equally applicable to the happy winery. Spending a small amount of time during slower periods of winery activity on training of motivated staff might produce big dividends when the unexpected emergency strikes. The large wineries have such programs, and other members of the food processing fellowship, such as seasonal canneries, go through the training cycle each year for an entirely new group of employees.

You can carry the training step to its ultimate personnel management goal by cross-training individuals, so that more than one person knows how to tear down a pump and replace a bearing seal—it's just another form of increasing overall system reliability by creating redundancy in maintenance skills among the working staff.

Underlying all of the maintenance training philosophy should be a strong program of safety. The Wine Institute has always been a good reference source for winery safety matters. Whether it is working with dangerous chemicals, electrical circuits, machinery or unvented spaces such as pump station wet-wells, all of the staff should receive periodic briefings on

safety precautions. If that kind of program saves one smashed fingernail per season, it is well worth the effort.

PM with a PC

With a little imagination, any winery with computer access could integrate many of the O & M functions into a computer's great data assimilation capabilities. Parts lists, repair histories and equipment specifications could all be simply and regularly processed. The sale of a used piece of winery equipment might be enhanced by a printout of its entire operational and repair history. Full disclosure is a great way to quickly gain a buyer's confidence.

(NOTE: If any PW reader would like to begin a systemized maintenance program, I will make sample formats of equipment information sheets: weekly, monthly, quarterly and annual PM record sheets that can be adapted to your own winery situation. Send a self-addressed stamped envelope to the PW offices for a packet of starter forms.)

D.R. Storm is president of Storm Engineering and owner/winemaker of Winters Winery, Winters, CA.



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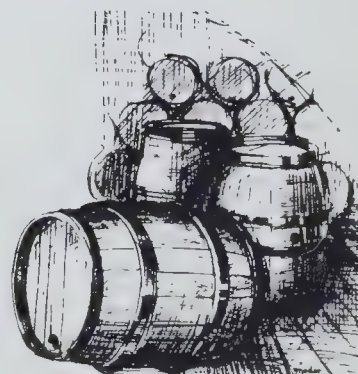
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Crop Prediction Techniques

Pat Summers

If one could predict how many tons of grapes there were in the vineyards, growers would not be rushing to find a home for extra grapes at the last minute ... or groping for explanations for their buyers as to why there aren't as many grapes as promised. Wineries, if they knew, would have all the tank and crushing facility use well-planned and utilized, wasting neither time nor resources. And prices might be a bit more stable.

Truth is, predictions are still a fumbling science. Somewhere between Plan A) Call your neighbor and say 'Whatcha think?', and Plan Z) The day before harvest remove every cluster and weigh them all, there must be a reasonable way to estimate the crop. We talked to several people about this, and we found some interesting approaches to the problem.

Kelly Krug, State of California Bureau of Agricultural Statistics, Sacramento, discussed the estimate of all California grapes:

In 1985 the State of California will again take up the task of crop estimates. Since 1981, the State has been trying to compensate with a paper survey estimate. The State crop estimates have always incorporated the monthly grower 'crop condition' surveys, but except for the years '81 through '84 they were not the sole source of information. Now that there is funding from the Winegrowers of California and the Raisin Advisory Board, the 1985 estimate will launch a \$60,000 (including start-up costs) program using objective survey. The funding for '86 and beyond has not yet been secured.

In the 12 years preceeding 1981, according to figures cited by Krug, their predictions have been just slightly better than 5% of the final crop. However, in some of those years they were off as much as 15-18%.

"We stratify the sample," explains Krug. "We set it out according to the known acreage. So, because the North Coast has 10% of the acreage, it will get about 10% of the grape

samples. We target about 1,000 vineyards throughout the state."

The State uses about 40 part-time employees, and pays about \$6.00/hour. The estimator receives 46 hours of instruction on the methods used in grape sampling, but is not necessarily knowledgeable about grapes. Krug comments, "They have to know how to count, and they have to know how to determine which is a cluster versus what we call a nubbin or peewee." There is a quality control program.

The count will be done this year much as it was during the last objective survey in 1981. The surveyor comes to the vineyard with the vines to be used already mapped. "We use random tables," says Krug, "and we base this on the size of the vineyard, number of rows, and total of vines in the row. Setting this up ahead of time removes the potential biases for the sample location." A 'vine', cordon-pruned, is one vine, a 'vine', cane-pruned, is the space between grape stakes, or two half-vines.

Early to mid-July the bunches are counted, and each cluster is tagged. Approximately 10% of those clusters are randomly selected to take to a 'laboratory' to be weighed and measured. The weight and length of the bunch is determined. Figures gathered in July are then compared with previous July figures. Historically the ratio of July data to final crop is pretty consistent. And it is from these figures that the projection is made.

The State is not rigidly tied to its methods. Krug adds, "We have indicated that we are willing to look at anything that might improve the accuracy of the report. Depending on any breakthroughs we may discover, or other work done on crop estimating through the universities, we are willing to adapt the system."

Clark Smith, with R.H. Phillips Vineyard, Esparto, CA, has developed the following mid-season crop estimation system:

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"When obtaining samples for crop yield predictions, it is convenient and useful to measure the precision of the estimate at the same time. The variability within the sample can be used to determine the appropriate sample size for a given degree of precision.

"Suppose one wished to estimate the average cluster weight of a Sauvignon blanc crop at harvest. A random sample of 30 clusters might be taken. If individual clusters are weighed (we use a top-loading digital balance for convenience), the 30 weights can be entered into a pocket calculator with a statistical function (costing \$15.00 and upward) and a standard deviation obtained. We're assuming the distribution of weights approximates a bell-shaped curve, or Gaussian normal distribution.

"This is our best estimate of the variability in the weights of clusters throughout the vineyard. Suppose the average weight is 150 grams $\pm$ 25 grams. This means that we expect 68% of the clusters to fall within 25 grams (one standard deviation) of 150 grams. About 87% should fall within $1\frac{1}{2}$ standard deviations, 95% within 2, and 98% within $2\frac{1}{2}$ standard deviations.

"But how good is our estimate of the average? This depends on the sample size. The precision of our estimate improves as the square root of the sample size. The standard error in our example would be 25 grams/ $\sqrt{30}$ or about 4.6 grams. We could double this precision with a sample of 120 (four times as large).

"Estimating crop yield early in the season requires pooling several estimates:

$$\frac{\text{Weight}}{\text{Acre}} = \left(\frac{\text{Weight}}{\text{Berry}} \right) \left(\frac{\text{Berries}}{\text{Cluster}} \right) \left(\frac{\text{Clusters}}{\text{Vine}} \right) \left(\frac{\text{Vines}}{\text{Acre}} \right)$$

"Whether there is more variability in berry weight, cluster size, or clusters per vine will depend on the condition of the vineyard and on the variety in question.

"We can know vines per acre exactly. Misses can be sampled as if they are real vines, but this will increase variability of cluster weight (some clusters weigh zero.) We prefer to estimate the percentage of misses and sample only productive vines.

"Clusters per vine is obtained by counting randomly-selected vines. To avoid selection bias in the field, we use vineyard maps which show every vine to randomly select vines for cluster counting before entering the vineyard. A mean and standard deviation are obtained from the calculator.

"Independent from this determination, clusters are randomly obtained and berries per cluster estimated. We simplify this process by weighing 200 berries for an average berry weight and dividing each cluster weight by this figure. Two errors are involved—the berry weight standard error (standard deviation of individual berry weights divided by $\sqrt{200}$) and the cluster weight standard error (individual cluster weight standard deviation divided by the square root of the total of clusters sampled).

"All these standard errors can be pooled for an overall estimate of precision. Each is expressed as a fraction of its mean. Then the pooled standard error is simply the square root of the sum of the squares of the individual standard errors:

$$S_{\text{pooled}} = \sqrt{S_a^2 + S_b^2 + S_c^2 + \dots + S_n^2}$$

"We can best improve precision by concentrating on larger sample size for the particular error that is largest. If we have a 5% error in clusters per vine, 2% in berry weight and 15% in weight per cluster, our overall error is:

$$\sqrt{5^2 + 2^2 + 15^2} = 15.9\%,$$

and we had better weigh more clusters.

"In our vineyard, we generally accept pooled standard errors of 15% for our crop estimations early in the year. Greater

precision is not useful because final berry weight is subject to the vagaries of nature, and the equation requires a pure guess to be plugged in. In 1983 and 1984 we accumulated records for berry weight vs. Brix for each varietal over the growing season. This ratio of berry weights between the two years appeared to hold constant over the growing season. Our Chenin blanc, for instance, weighed 65-70% of the previous year's from 12° Brix until harvest. This may serve as a useful early predictor of final berry weight. Added experience and continuing compilation of records will undoubtedly allow us to refine this estimate.

Ray Damskey, Dutch Henry Vineyard, Calistoga, CA, uses a post-bloom crop estimation technique. Damskey prefers an annually generated random selection of vines to be tested. He is more comfortable with a process that uses the same vines in any given year, as opposed to using different vines (a practice of some growers) for any re-sampling process.

"There is enough variation in each cluster," says Damskey, "and the total of clusters on each vine to give more variation than anyone wants to handle in any case. If the vines picked out for sampling are chosen in a completely random fashion, where every vine has an equal chance for selection, there is no reason for changing vines. Progress during the ripening can be followed, perhaps, more accurately. I say 'perhaps' because I don't know and only through field tests over a year or two could the thesis be proved."

For crop estimations at the five-acre Dutch Henry Vineyard, Damskey uses this equation:

Basic equation (1)

$$(\text{clusters/vine}) (\text{lb/cluster}) (\text{vines/acre}) (\text{tons/lb.}) = \text{tons/acre}$$

"How big should the sample be?" asks Damskey. "Although I'm not completely satisfied, the following equation has worked well for me during the three years I've used it."

$$\text{Equation (2)} \\ n = \left(\frac{\lambda \sigma_x}{\delta} \right)^2$$

where n is the total of vines to be sampled,

σ_x is the standard deviation (standard error) of sampled variable,

λ is the confidence level required by the sampling program,

δ is the allowable error.

"Within any given section of our vineyard, exterior effects (such as soil, water and fertilizer), are the same. Vines are in rows and there is a specified total of vines in each row; therefore, theoretically, each vine has a number. By using a table of random numbers or generating the random numbers with a computer or desk calculator, 'n' random numbers are generated, with each vine having an equal chance of being tagged, to specify our sampling vines (random number multiplied by total of vines—excluding non-productive locations)."

Discussing the variables in the equations used in the industry, Damskey says, "Every variable in the equations, except the 2000 lb/ton, has a variation. These variations need to be included in the calculations. Without getting into a lot of statistics, people should recognize that there are variations in the vineyard and anytime a variable is measured, the result is only a random number representing a value from the normal or skewed distribution of all the values possible to be measured in the vineyard. The solution of the basic equation (1) gives the expected or mean value of the substituted equation. The chance of getting that value upon harvest is very, very small. What we need to know is the range of values that are acceptable. And this involves each of the standard errors (deviations) of the non-fixed variables in the yield equation. It is called propagation of error.

"Fortunately the partial differential equation can be simplified (*Applied Statistics for Engineers*, William Volk, McGraw-Hill, 1958, page 141). The result is the standard error (deviation) of the prediction. If the standard error is too great, increased

sampling of all the variables involved will usually decrease the individual standard errors."

Damskey offers this sample of variable change:

What	Median	Mean	Standard Error
82 Cluster weight	198	209.4	81.2
83 Cluster weight	197	193.9	93.8
84 Cluster weight	177	181.4	72.0
83 Cluster Count/V	18	19.1	11.0
84 Cluster Count/V	32	31.6	15.6

"The cluster weights were taken (just under 200 samples) from gondolas at harvest and were as random as my nearly unbiased eye could select," adds Damskey. "By taking a big enough sample I hoped to reduce the bias.

"Even though this is only a small vineyard, the predictions of yield in each of the first three years has been within the error range of acceptability (the confidence levels I used). Actually, sometimes a small vineyard is harder to predict than a larger one. The overs and unders will tend to cancel each other. There is also a statistical rule here that when skewed distributions are aggregated, they will tend to form a normal (or bell-shaped) distribution."

C.A. MacGregor, of MacGregor Vineyards, San Luis Obispo, CA, has a method that could be called early season assessment. He looks at crop estimates from a different perspective. Of course, he has the same problems of sampling size everyone else has but his overall problems are much more involved, and for that reason his equation is far more inclusive.

There was no historical data for growing grapes when

MacGregor came to Edna Valley. Data he has since developed shows that a mild winter can drop the crop to half the expected size because of lack of dormancy. A 'cold' winter (one with at least 200 hours in January and February that fall below 40°F) can increase bud break enough to give twice the yield. A cool or mild spring can affect fertilization, which in turn will affect the crop at the same scale.

It is the practice of most Edna Valley growers to leave extra buds at pruning, and adjust the crop later in the year. MacGregor contends that the grower can also affect the crop size by his control of the berry size. Berry size is determined by the temperature at set. This MacGregor controls by creating a microclimate for the vines. Berry size is also determined by irrigation practices.

In the fall of 1983 MacGregor presented the following formula to the Viticulture Management Class at the Santa Rosa Junior College. It is the step-by-step collection of data to guide him in his production.

Yield per vine = (total of clusters/vine) (cluster weight)

Total of clusters/vine = (total of buds after pruning) (shoots/bud) (flowers/shoot) (clusters/flower). The process and 1983 figures were:

α = bud break coefficient = shoots/bud left [0.74]

β = bud fertility coefficient = total flower primordia/shoot [0.96]

γ = flower fertility coefficient = total of clusters/flower [0.80]

therefore clusters/vine = (bud break coefficient) (bud fertility coefficient) (flower fertility coefficient) (buds left) or
clusters/vine = (α) (β) (γ) (buds left at pruning)

cluster weight = (total fertilized berries/cluster) (weight/ berry) (rachis factor) (shot berry factor) ('take away' factor)

δ = rachis factor = (rachis weight + berry weight)/fertilized berry weight [1.05]

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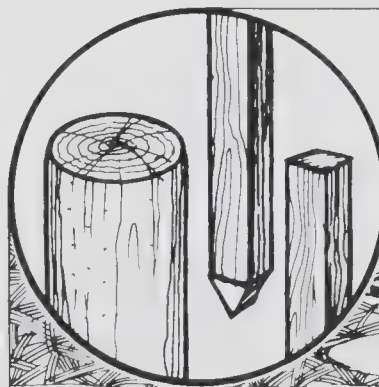


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ϵ = shot berry factor = (shot + fertilized berry weight)/fertilized berry weight [1.11]

ζ = 'take away' factor = total lost to birds, fungus, thinning, etc./no loss [0.77] or

cluster weight = $(\delta)(\epsilon)(\zeta)$ (total of fertilized berries/ cluster) (weight/berry)

total fertilized berries/cluster = (florets/flower primordia) (fertilized berries/florets)

fertilized berries/floret = (berries pollinated/floret) (berries fertilized at set/berries pollinated) (cluster closure coefficient)

η = pollination coefficient = total berries pollinated/total florets [0.47]

θ = fertilization coefficient = total berries fertilized at set/total of berries pollinated [0.77]

ι = cluster closure coefficient = total berries fertilized at harvest/total berries fertilized at set [0.71] or

fertilized berries/floret = $(\eta)(\theta)(\iota)$ (florets/flower primordia) [406]
Weight/berry = (berry volume) (density)

therefore cluster weight = $(\delta)(\epsilon)(\zeta)(\eta)(\theta)(\iota)$ (florets/flower primordia) (berry volume) (density)

therefore yield per vine = $(\alpha)(\beta)(\gamma)(\delta)(\epsilon)(\zeta)(\eta)(\theta)(\iota)$ (buds left at pruning) (florets/flower primordia) (berry volume) (density)

For a 12-acre block the vineyard is divided into four equal sections. Each of these sections is divided into twenty equal areas. The plant in the center of each of these twenty areas was identified and numbered. These are the sampled plants. The first lesson learned, according to MacGregor, was that he could probably have done with fewer samples; ten may have been enough.

"I make a count about bloom time," says MacGregor. "I count the total of buds pushed, total of shoots, total of flowers primordia and the total of florets/flower primordia. From this I can find the alpha and beta that go into those coefficients. That is compared to the historical data at hand to see where this year's crop is headed.

"In July we go back into the vineyard and make a count. We are now post-set. We count the total of clusters, and the total of shot berries. We have the fertilized berries and the total of berries/cluster. From this, I can then find the gamma, the total of clusters/flower and I can also get the fertilization coefficient . . . and some of the other coefficients."

The rachis factor is something that remains the same over the years, but MacGregor does not expect the other coefficients to remain constant each year. "These coefficients depend on the weather, and upon viticulture practices. They also depend on the quality of the pruning crew. The better the pruning crew, the better wood you have left, and the higher bud break coefficient there is."

The third sampling period is from July to harvest. During that period samples are taken almost weekly. "I determine

the cluster weight, the total of berries/cluster, and the berry weight. I keep track of the berries that are fertilized." MacGregor samples 100 berries at a time, weighing and measuring the diameter of each.

"I also keep track of the sugar, and maybe every other time measure the acid and the pH. I plot these variables against the calendar time." The difference in MacGregor's curve is that it is from a large number of samples.

"All you have to do is sample and look at the coefficients." These figures will give more information than just the weight of the crop, and this is what MacGregor claims growers must know of their own vineyard. "When you do some of these experiments, you end up with as many questions as when you start but you have a good time doing it," MacGregor told the SRJC class. "I think that everybody has to make their own measurements. I don't think that what is applicable for me in Region I in Edna Valley—Chardonnay on its own root, drip-irrigated, and deep soil—is necessarily applicable to anything else. I think the principle may be, but the absolute values are ours alone. You have to make your own measurements. I also think that an improvement in the quality of the grape will only come from doing all this. As the sales people always say, you have to know your product."

MacGregor does exactly what he tells the students. In his first 1985 sampling he knew the pruning crew had left better wood, that the cold winter had given him a dormancy that increased the potential crop by about 50%. Pleased with these favorable factors, he says, "In 1985 we are growing grapes like they should be grown." MacGregor will continue his sampling through to harvest time, using the information to deliver to his wineries grapes that are the desired sugar, acid, pH and berry size.

A much more sophisticated approach to very early crop estimation has been proposed. W.M. Kliever, Professor of Viticulture at University of California, Davis and graduate student Pat Bowen have proposed another approach.

As the proposal reads, they would construct a statistical model which will 'describe the growth and development of grapevines from pruning until harvest'. The modeling-analysis system to be used is known as Sequential Yield Component Analysis (SYCA), a system used in other fruit crops.

"The model follows the developmental sequences of reproductive components including the differentiation and development of fruitful buds, fruit set and berry enlargement," says Kliever. "Analysis of the model will calculate the incremental contribution of each component to yield variation as it develops, along with its dependency upon trunk and cane structure and upon early vine growth. Compensation among yield components, the phenomenon which results in a maximum attainable yield for a given vine capacity, will also be detected by the analysis. SYCA results will indicate which aspects of vine structure and early growth are most yield determining and at which stage of development reliable predictions of crop size can be made.

"Examples of some early components that can be included in the model are trunk volume and its carbohydrate content, post-pruning bud total, percent bud push, leaf initiation rate and cluster total.

"Where early components are shown to determine yield, it will be possible to predict yield; it will be possible to predict crop size at the beginning of the season. Yield predicting equations will be constructed and their reliability calculated from SYCA results."

All of the contracts have yet to be signed, but the proposal has been approved for funding by the California Winegrowers. It certainly would open many doors for information on crop estimation.

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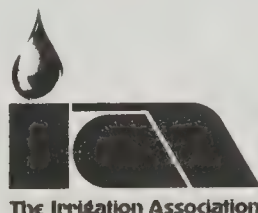
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Chambourcin

Eleanor & Raymond R. Heald

Chambourcin, the French hybrid originally named Johannes Seyve 26-205, has been available for commercial planting since 1963 and offers good potential for quality red wine production to the eastern U.S. wine industry.

Chambourcin is described by Pierre Galet as a vine with "good resistance to both downy and powdery mildew, with sensitivity to lime soil which indicates that it should not be planted in drought conditions". In France, the cultivar is rated as both vigorous and a consistent producer, and is authorized in various départements: Loire Valley, the Dauphine (including departments of Isère, Drome and Hautes-Alpes), and several départements in the southwest.

It is one of the principal hybrids propagated in French nurseries. In 1958, 31% of total French vineyard area was planted to hybrid varieties, including 158 acres of Chambourcin. By 1975, hybrid plantings in France had dropped to 20% of the total, but Chambourcin had increased to 12,300 acres, thereby significantly surpassing some selected vinifera varieties such as Aligoté and Gewürztraminer.

According to Carl W. Haeseler, Professor of Pomology at Pennsylvania State University (PSU), "Response to soil conditions is evident, as it produces considerably better on deep, well-drained soils. Over a six-year bearing period at the PSU research stations in both Adams and Lancaster Counties, PA, Chambourcin averaged seven tons/acre. It is moderately vigorous as a

young vine, and gains vigor with maturity." He also indicated that the varietal has been grown on a small scale in Erie County, PA, for 20 years.

Chambourcin is sensitive to low winter temperature as Haeseler recalled that it was completely out of production at the PSU research station in 1979 following one of the most, if not the most, severe winters on record in that area. This may be a reason why growers in the Finger Lakes region of New York State have not experimented with it to any great extent. Chambourcin has been successful in southwest Michigan, New Jersey, the Lake Erie region of both Ohio and Pennsylvania, southern Pennsylvania, South Carolina and Texas. There are new commercial plantings in Missouri, Maryland, and Virginia due to the good words being spoken about Chambourcin in the 'pioneer' states.

Galet describes Chambourcin fruit as having a distinct bouquet and herbaceous flavor, two qualities evident in the wine. Its greatest appeal lies in the generally accepted characteristic French red hybrid qualities it lacks! In its youth, Chambourcin takes on all the positive aspects of a Beaujolais-style wine. It seems to age gracefully without developing undesirable red hybrid character in both bouquet and aftertaste.

While touting the potential of Chambourcin, most winemakers admit that their experience is limited to no more than five years. Only Tom Wykoff, winemaker/owner of Cedar Hill Wine Company, has experience producing varietal Chambourcin dating back to the 1975 harvest.

CEDAR HILL WINE COMPANY

PW: Describe your style:

Tom Wykoff: A normal growing season in the Lake Erie district produces a full-bodied Chambourcin. It has intense peppery fruit and a crisp acidity that marries well with extended oak maturity. Chambourcin also provides a good level of grape tannin that does not exist in most other cold-district hybrid reds. After 1 ½ years of barrel ageing and one year of bottle ageing, the wine is similar to a young Rhone. Its robust flavor best complements full-flavored meats.

As it matures 5-10 more years, wood marries with the fruit to produce the 'barnyard' character of a French Burgundy. After nine years, my wine shows no signs of tiring—color, fruit and acidity remain very stable. In this period, the wine complements any game, especially if roasted with a variety of fresh herbs, just like a Côte de Nuits. From what I've observed with my 1975 Chambourcin, I'd estimate cellaring potential to be at least 15 years.

PW: Describe the vineyard:

We purchase from Gerlosky Vineyards in Madison, OH. Two acres of Chambourcin are spaced 9x8 on a 10% northern slope along the southern Lake Erie shore at 900 feet elevation. A bilateral cordon at 5.5 feet grows renewal canes that are tied to a 3-foot wire below. They are short spur-pruned for 25-30 buds/vine. Crop size is controlled by cluster thinning to two buds/cane to yield an average of three tons/acre. Early vine vigor can produce shot berries.

Soil is silt-loam with topsoil running 6-8 inches in depth and a pH of 5.5. Calcium nitrate is applied as fertilizer at 30 lb/acre yearly. Subsoil is principally heavy clay that is low in organics. The vineyard is tiled for adequate drainage and is not irrigated.

2,400 degree days are average for this region of Lake Erie. This is about 50 more than needed to ripen Chambourcin in any growing season. Winter lows of -18°F that cause bud damage are not unusual for a period of one week. Frost

damage can occur from early April through late May. Bud break is early May, berry set 3rd week of June, and veraison mid-September.

PW: *When are the grapes picked?*

Picking generally starts during the third or fourth week of October. We look for grapes in the range of 19.5-22° Brix, TA of 1.0-1.1, and pH between 3.0-3.2. Weather always determines final ripening. The last 2° Brix are very slow with only a small drop in acid. If stems are still green and weather is dry, I prefer to let bunches hang. If stems are red and little or no change in Brix and/or acid has occurred in the period of a week, we pick.

PW: *How is the wine made?*

Up to 35 ppm SO₂ is added at crush. The cap is punched down 4-5 times/day. When the cap falls and the must temperature begins to drop, we press and yield a total of about 165 gallons/ton. Fermentation temperature commonly peaks at 95°F and completes in 10-14 days.

First racking is done after completion of natural malolactic fermentation, usually in the fall, but it may be delayed until spring. No additional SO₂ is added until completion of malolactic fermentation. We rack two more times. Ageing can take from 12-24 months, in a combination of new and used decharred whisky barrels. A final ageing of 4-6 months is done in 130-gallon Yugoslavian oak puncheons. Topping is done every two weeks in summer and every four weeks in winter.

SO₂ adjustments to 30-35 ppm free are made at each racking. At bottling, we try to have the same amount of free SO₂, but that depends on pH. If the pH gets close to 4, we double the free SO₂ level. A 0.45µ filter is used before bottling and the wine is released approximately seven months later.

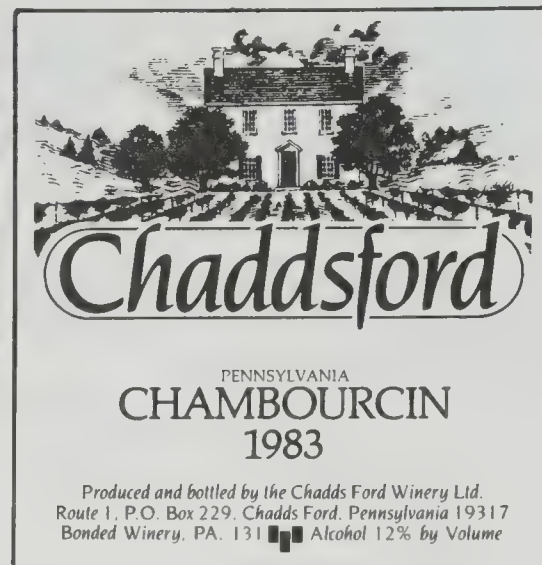
CHADDSFORD WINERY

PW: *Describe your style:*

Eric Miller: My 1983 Regular bottling of Chambourcin has a light, cherry nose with vanilla undertones. Flavor has similar fruit and wood and is smooth and long in the mouth. Partially due to high pH, I expect that it will improve or hold, with bottle age, for 1-2 years from vintage. The 1983 vintage, however, is atypical of what I aim for in Chambourcin.



Eric Miller



Grapes from Harborcreek Estate Vineyard (HEV) in North East, PA, were under-ripe and all 'typical' Chambourcin characteristics were lightened.

While I do not subscribe to heavy Chambourcin, I do make a Reserve wine, fermented two weeks on the skins, typically with fermentation temperature between 70-85° F, barrel-aged 12 months plus, to show the spicy, almost Dolcetto or Rhone-like, complex combination of earth, cloves and fruit.

These characteristics are found in my 1983 Reserve, from Seven Valleys Vineyard (SVV) bottled August 1984. For this style wine, if the TA is sufficient (about 0.68), and the gods are smiling, optimum drinking potential begins a year or two after bottling, and should improve over 5-8 years from vintage. I'm not completely confident that this bottling really has eight years ahead due to the effect of 1983 fermentation temperatures in the range of 50-55°F.

Chambourcin can age without developing a harsh, 'gun powder' aroma and flavor typically associated with hybrid reds. It has aroma and flavor elements of cherries, plums, cloves, tar and fresh tobacco and complements lamb and light red meats well. It can be very reminiscent of the Nebbiolo grape.

PW: *Describe the vineyards:*

I buy Chambourcin from two sources: SVV, managed by Lynn Hunter in York County, PA, and HEV, managed by Marlene and Doug Moorhead in Erie County, PA.

SVV has four acres planted to Chambourcin with an average age of six years. There are 630 vines/acre spaced 7x9.5 on four-arm Kniffin with the top wire at six feet and bottom wire at three feet. Hunter chose this particular system because not enough was known about the grape when she began to plant the cultivar in 1979, so she went with the training and trellising she knew best. Vines are pruned to eight buds on each fruiting cane plus two renewals. Crop size is controlled by cluster thinning. The harvest yields were 2.84 tons/acre in 1982, and 3.47 tons/acre in 1983.

SVV is at 800 feet elevation, with a southern exposure on a 8-10% slope. Soil is well-drained, moderately fertile Chester Loam with a pH of 6.8 and topsoil layer of 11 inches. Subsoil is Chester Silt Loam to a depth of 60+ feet, where it reaches bedrock.

Fertilizer in the form of 46% urea is applied annually at 170 lb/acre about two weeks before bud break, usually occurring the third week of April. Degree days average 2,900 which Hunter believes is adequate to ripen Chambourcin. But in 1983, when 2,809 degree days were registered, she had 1,800 lb out of the total crop of what she considered biologically

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Tom Wykoff



unripe fruit at 17.1° Brix. Hunter admits that a larger crop size that year may have contributed to this. She believes the vine to be highly susceptible to black rot because the crop was reduced by 90% due to this disease in 1984.

Rainfall averages 45 inches/year. To counteract some erosion problems, perennial rye grass has been planted between vineyard rows. Winter low temperatures of -10°F occur on one or two nights, resulting in some trunk injury. Frost damage is possible through late April. Berry set is mid-June and veraison is in the second week of August.

(For data on HEV see vineyard section under Presque Isle Wine Cellars.)

PW: When are the grapes picked?

Early to mid-October is the general harvest period at SVV. I like to see the following parameters from this vineyard: 20-23° Brix with TA about 0.9 and pH close to 3.35. In 1983, I received HEV grapes at 15° Brix with TA of 0.97 and 3.15 pH because they were over-cropped. While I consider this substantially under-ripe, the resulting wine is palatable, almost Beaujolais-like.

In determining picking date, I seek a fully developed, ripe grape, but I'm finding that in addition to numbers indicating ripeness, berry clusters, when ripe, feel soft yet resilient. Naturally, early frosts or heavy autumn rains are weather conditions that can affect grape quality, and one must gamble nearly every vintage. Grapes are handpicked. For the style I seek, a little juicing, and therefore oxidation and stem/skin contact, seem beneficial.

PW: How is the wine made?

For the Reserve wine I use only single vineyard grapes. Stems remain in contact during primary fermentation with only about half the berries broken and 0-50 ppm SO₂ added. Fermentation temperature may peak at 75-80°F, but in '83 we maintained it around 55°F. In '84, the temperature was increased to 70-75°F to increase tannin extraction for longevity and mouth feel along with an increase in color. I consider primary fermentation complete when the cap falls plus one or two days. This is generally a two-week period.

If chaptalization is necessary, it is done 2-3 times to extend primary fermentation and bring the total Brix level to 22°. In order to maintain an undisturbed CO₂ cap and continue juice, skin/stem contact for 14 days to 0° Brix, punch-down is once every 2-3 days. PSU-1 malolactic bacteria is added as soon as fermentation begins, and malolactic fermentation is complete by the end of December following harvest.

At pressing, yield is a total 160 gallons/ton. First racking follows pressing at 3-6 weeks. We rack 3 or 4 times and maintain free SO₂ levels between 20-30 ppm at rackings.

The wine goes to barrel by January. Bigger, deep-colored, tannic vintages are in barrel over one year, lighter vintages 6-8 months. A combination of new and less than three-year-old American oak barrels are used exclusively. Barrels are turned to two o'clock, and topped every two months. Detartration occurs during the winter at ambient temperatures.

A tight pad filtration is done. At bottling, free SO₂ levels are adjusted to 40-45 ppm so that it falls to 25-30 ppm after two months in the bottle.

Viniculturally, Chambourcin has no serious problems, but I have noticed that unripe fruit and fruit from very young vineyards produce wine with insufficient color. In the past, I have added enzyme, prior to fermentation, to counteract this, but it did not help much.

My regular bottling of Chambourcin differs from the Reserve in these ways:

30% stems are added back after crushing and destemming. After yeast inoculation, I may ameliorate up to 10% if necessary. Fermentation on skins continues for approximately eight days to around 8° Brix.

First racking is 2-4 weeks after primary fermentation com-

Grand River Vineyard



mark's way

Grand River Valley Tablewine

GROWN, VINIFIED AND BOTTLED BY
GRAND RIVER WINE CO.
MADISON, OHIO

ALCOHOL 12% BY VOLUME



Bill Worthy

pletes, depending on progress of malolactic fermentation. The wine is stored in stainless until clear, usually in January. At that point I add Oakmor, approximately 40 lb/1,000 gallons to the top of the tank, and agitate to mix it in well. Pumping over the wine does a good mixing job. I rack off the Oakmor settlings 2-3 days later and continue stainless storage until bottling in May or June. With the Oakmor I have found that 'old chips' are not effective. I order them no more than 60 days prior to use. They add just the right amount of oak character for moderate complexity in this lighter-style Chambourcin.

GRAND RIVER VINEYARD

PW: Describe your style:

Bill Worthy: We have found through trial-and-error that a blend of 2/3 Chambourcin and 1/3 Leon Millot makes a wine with sensory characteristics surprisingly similar to those found in above-average French Burgundies. Up-front fruitiness of the Millot balances the structure and finish of the Chambourcin. We've tried several blending percentages. This particular one, done by our vineyard manager, Mark Walker, gave the wine its name, 'Mark's Way'.

When we release our Chambourcin blend about 1 ½ years from harvest, it is dry, has good fruit, medium body, nice tartness, medium tannin, adequate finish and a minty-spicy nose. These characteristics complement lamb dishes. Our Chambourcin begins to develop good bottle character after one year, but I believe that it will last 10 years because of the body and tannin attributable to the Chambourcin portion. The Burgundy nose that develops seems to intensify with age, and is one of the most appealing characteristics of the blend.

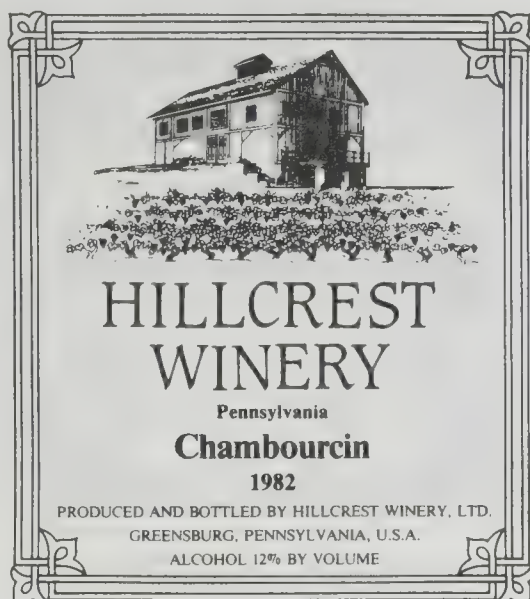
PW: Describe the vineyards:

We own 3.5 acres of 9-year-old Chambourcin vines in a vineyard seven miles south of Lake Erie. This is also about two miles south of Grand River Valley which runs parallel to the Lake Erie shore as it passes north of the winery. We are on a plateau with a view of Lake Erie about 1,050 feet above sea level and 350 feet above the lake. Principally flat with a northern exposure, the vineyard drops 28 feet in 1,600 feet.

There are 586 vines/acre, spaced 9.5x8 on single-curtain, with a top-wire cordon at a height of six feet. We prune to



Joe Policastro



two-bud spurs after an easy winter, and short arms after a severe winter. We shoot-thin to a limit of 30-36 canes and fruit-thin to one cluster/cane. Suckers are brought up for trunk renewal every year. Average yield is 2.5 tons/acre. I chose this system for ease of pruning, brush removal and tying. It gives the fruit good sun exposure and because Chambourcin is a long grower, sufficient height is maintained to avoid running over canes with a tractor.

Soil is clay, heavy in some places and lighter with small rocks in others, and a pH between 4-5. We lime every three years at two tons/acre. Topsoil is very shallow, averaging not more than one foot, and the subsoil is yellow clay above shale. Annually, 244 lbs/acre of calcium nitrate is applied along with 244 lbs/acre of mix that is 20% urea, 20% phosphorus and 60% sulfate of potash.

Degree days average 2,300+. When properly thinned, Chambourcin should ripen with 2,200 degree days. Rainfall during the growing season is highly variable: from 15 to 35 inches. We have 50,000 feet of drain tile every third aisle. Although the record low for this area is -24°F, we generally have six sub-zero days each winter with -5 to -10°F for a 2-3 day period. Temperatures this low can do both extensive bud and trunk damage.

Bud break is between May 2-11 with berry set about June 20 and veraison in mid-August. Frost damage can occur from time of bud break through the end of May.

I have noticed injury to Chambourcin vines from air pollution, apparently ozone stipple. Some years there is no noticeable damage, yet in other years, it extends to the point of defoliation and growth of laterals.

PW: When are the grapes picked?

We generally harvest Chambourcin between October 20-31 between 20-22° Brix, 0.9-1.2 TA and 3.2-3.3 pH. Since our wine always goes through malolactic fermentation, high acid is rarely a problem. With this cultivar, low acid is never a problem, so we judge picking by Brix level. Leon Millot, the blending grape, is harvested mid-September in the range of 22-24° Brix, 0.8-0.9 TA and around 3.3 pH.

PW: How is the wine made?

After crushing and destemming, 75 ppm SO₂ is added. Estimated skin contact time is 5-7 days depending on how long it takes for fermentation to start. We punch-down three times/day until the cap sinks. 85°F is an ideal peak fermentation temperature, if we can get it there. During active fermentation, 80°F is typical. Pasteur Red is hotter and faster

than other yeasts. Total yield after pressing is 160 gallons/ton.

First racking is done in late November or early December, and we rack two more times. The wine remains in wood 18 months or less depending on the quantity of new barrels used. We use newly decharred whisky barrels, some new American oak and some older barrels of both types. We top once every two months and make adjustments to 30 ppm free SO₂.

Leon Millot from the following harvest is fermented apart from the skins and cold pressed. Final blend of 30% Leon Millot and Chambourcin is made in the summer, following the Leon Millot vintage, when we are sure that malolactic fermentation is complete in the Millot.

A pad filtration is done prior to bottling.

HILLCREST WINERY

PW: Describe your style:

Joe Policastro: Our Chambourcin always has good, deep color, and a pronounced berry-like, even spicy aroma, with hints of oak. During its first year in the bottle, while showing youthful, purple coloration, it has full body and a balanced acidity that makes it a good accompaniment to beef and all types of pasta with red sauce. My experience with Chambourcin is too limited for me to estimate cellar potential. What I have heard from other Eastern winemakers with experience gives me hope that we have a red variety with positive characteristics for extended bottle ageing.

PW: Describe the vineyards:

I buy all my Chambourcin from Moorhead Vineyard #16 2 (MVI), in the Lake Erie region of PA. At an elevation of 800 feet, MVI is gently sloping with a drop of 15 feet in 110 feet. There are 2.38 acres of four-year-old vines planted 605/acre, spaced 9x8 on Umbrella Kniffen.

The Moorheads tried other systems previously, primarily six-cane Kniffen. It did not work well because Chambourcin has soft canes and a drooping habit. With balanced pruning of 16-20 buds/cane during the dormant season, cluster thinning just prior to blossom, and some shoot thinning later, a crop of approximately 2.34 tons/acre is produced.

Soil is Conotton gravelly loam with an eight-inch topsoil of weak, fine, granular structure, friable when moist, and a pH of 5.6. Between 11-18 inches, it changes to coarse, sandy loam that is slightly hard when dry, very friable when moist, and nearly all grains of sand clay-coated. Below this, to a depth of 24 inches, you find loamy, coarse sand with weak, medium subangular, blocky structure. From there on, to a depth of 56+ inches is fine sand and gravel, stratified and structureless. Vineyard fertilization consists of 70 lb nitrogen as ammonium nitrate and 50 lb potassium oxide as muriate of potash applied annually.

This region of Erie County, PA, has 2,600 degree days which is borderline ripeness for Chambourcin. Rainfall averages 18+ inches during the growing season, May through October, and 33 inches annually. The record vineyard low is -16°F, but generally, -10° is reached once every 10 years on one night with 0°F expected each year, on at least one night, and possibly more. Zero and sub-zero temperatures cause loss of many primary buds, but little trunk damage. Average last killing spring frost is April 20.

PW: When are the grapes picked?

I anticipate harvest of Chambourcin in late October through early November. 1982 was earlier than normal, about October 21. It is definitely an end-of-the-season variety and barely

ripens in most years, in my estimation, with Brix between 17.5-18.5° and 1.2-1.5 TA.

PW: How is the wine made?

Skin contact is 5-7 days, the length of fermentation in stainless steel open tanks. When fermentation temperature reaches 68°F, 50-75 ppm SO₂ is added. The cap is punched down two times/day. Yield is 158 gallons/ton of free-run juice only.

Racking and blending with Leon Millot is done before oak ageing that lasts a period of 14 months in new, American oak barrels. Barrels are topped every 10 days and free SO₂ is maintained at 75 ppm. 4-8 egg whites/100 gallons are used for fining. A medium pad filtration is done prior to bottling.

NAYLOR WINE CELLARS

PW: Describe your style:

Dick Naylor: I produce two Chambourcin bottlings, a Regular and a Reserve in years when grapes are of sufficient quality to warrant French oak ageing. Both bottlings are rich, berrylike, luscious, oaky and long-lived. The Reserve wine has greater complexity and should age longer. Chambourcin, like Cabernet Sauvignon, is a perfect accompaniment for rack of lamb. It is also excellent with venison and wild goose.

Both bottlings have from 4-10% Cabernet Sauvignon blended in. Blending percentage depends on availability of Cabernet Sauvignon grapes in any year. I would like to add between 8-10% every year. Blending with Cabernet Sauvignon began as an accident that proved beneficial. I buy 50% of my Chambourcin from Seven Valleys Vineyard. In 1981, Hunter told me she was going to sell me some Cabernet Sauvignon also. The morning of the Chambourcin delivery, Hunter phoned me and said, "Can I include a few hundred pounds of Foch in the delivery?" I said OK.

We unloaded the grapes straight into the crusher. My son-in-law, who helps at the winery, commented, "Look at these bunches with small berries in here." I told him not to worry, there were only a few hundred pounds of Foch and they'd essentially get lost in the two tons of Chambourcin. I thought no more about it until I signed the delivery slip. No Foch was listed, but 500 lb of Cabernet Sauvignon was. This amounted to 8% of the blend that year. We liked it and have continued to use Cabernet Sauvignon each year since the serendipitous accident!

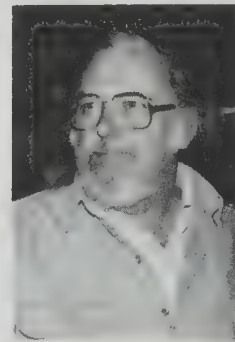
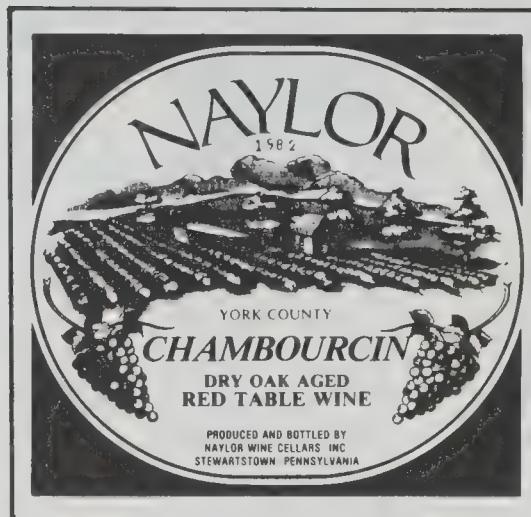
At optimum maturity, 5-10 years, Chambourcin is velvety with raspberry-fruit qualities. It has excellent color, soft tannins, and ability to produce a great Eastern red, better than any other hybrid variety, at a reasonable price.

PW: Describe the vineyards:

50% of the grapes come from SVV. (See details under Chaddsford Winery vineyard section.) The remainder comes from my half-acre plot (8-10% slope) planted in 1979. I planted two additional acres on a 20% slope in 1982.

We have 650 vines/acre spaced 6x9 on a three-wire modified Kniffen system. Wires are spaced at 30, 50, and 72 inches above ground. In spring, I prune to six buds/cane leaving 36 buds/vine. The newer vineyard is bilateral cordon, spaced 5x9. I will prune these to five spurs with two buds/spur. This newer system should prevent over-cropping. We'll have 30% more vines/acre, but production on each will be less. Our assumption is that we will still get 4.5 ton/acre, but of higher-quality fruit. I cluster thin now. I'm not sure whether or not I will have to in the newer vineyard—I hope not.

Soil is Chester loam, well-drained with 6.2 pH. Topsoil is 18 feet deep, and subsoil is shaley, decomposed rock. This region of southern PA, in York County, normally has 3,200 degree days. About 3,000 are necessary to ripen Chambourcin. An-



Dick Naylor

nually, we have approximately 30 inches of rain with 5-7 inches during the growing season. Winter lows for 1-2 days at -15°F can cause bud damage. There is relatively little worry about frost damage here. Bud break is about May 10, followed by berry set in mid-June and veraison in late August.

PW: When are the grapes picked?

We pick Chambourcin in the first week of October. I look for these parameters: 20-22° Brix, 0.85-1.0 TA and 3.1-3.25 pH. I watch for rising pH to determine when to start harvest. Cabernet Sauvignon, the blending varietal, is picked in mid-October at about 20-22° Brix, 0.9-1.0 TA, and pH 3.2 or less.

PW: How is the wine made?

25 ppm SO₂ is added at crush along with 0.5 gram/gallon pectic enzyme. I add back all the Cabernet Sauvignon stems. Usually, the percent stems is slightly higher than the blending percentage because I make 50-100 gallons of varietal Cabernet Sauvignon each year. These stems add more Cabernet Sauvignon character to the finished wine along with some good tannins to build longevity.

Fermentation lasts 8-12 days at 65-80°F. We punch-down the cap in our open-top fermenters 3-4 times/day. Total yield averages 175 gallons/ton. First racking is done two weeks after pressing, then twice more, going into and coming out of oak. Free run and press wine are aged together. The final blend with Cabernet Sauvignon is made before the wine is put into American oak for 12 months. Topping is done once every three weeks and 45 ppm free SO₂ is maintained. The Reserve wine goes back into 2 ½-year-old Limousin and Nevers oak for an additional six months. Before bottling, a 1.0μ cartridge is ahead of the filler.

PRESQUE ISLE WINE CELLARS

PW: Describe your style:

Marlene and Doug Moorhead: Our wine is a typical, cool climate Chambourcin with good color, considerable berry-like aroma, plenty of oak and a salty, metallic taste that is characteristic of our area.

Regional taste components make it a good match for country foods like hearty beef stew. It always has good body even in years when it barely reaches maturity like 1980. It lacks herbaceous, grassy characters that make other red hybrids unappealing. Flavor composition can be enhanced with a variety of red blending grapes in years that do not have the

necessary degree days for full ripening. We particularly like its overall character blended with Cabernet Sauvignon.

1980 Chambourcin will likely reach full maturity in the next two years, while the 1982, which had more balanced ripeness in the fruit at harvest, is showing less fruit character and softer oak for longer cellaring potential in the range of 4-8 years.

PW: Describe the vineyards:

The 1980 wine was made from Harborcreek Estate Vineyard (HEV), under our management in the Lake Erie district. Vineyard elevation is 720 feet with 1.35 acres of eight-year-old Chambourcin planted 605 vines/acre, spaced 9x8 on Umbrella Kniffen yielding approximately 5.5 tons/acre. (Selection of the training, trellising, pruning system and control of crop size is identical to Moorhead Vineyard #16-2 (MVI). Data for MVI can be found in the Hillcrest Winery vineyard section.) Our 1982 wine is 100% Chambourcin, 25% from HEV and 75% MVI grapes.

HEV is essentially flat with Conotton Gravelly Loam and Conotton Gravelly Sandy Loam soil. In the Conotton series, soils are deep, well-drained, moderately coarse-textured to medium-textured on beach ridges with pH around 5.8, and can be cultivated intensively for deep-rooted crops. They have formed from stratified, acid gravel and sand containing a few thin layers of silt and clay. In most places, the stratified material is underlain by calcareous quicksand at depths of 4-20 feet. Depth to the seasonally high water table ranges from 18-72 inches.

We fertilize HEV with 60 lb nitrogen/acre yearly. Climate and rainfall at HEV is essentially the same as MVI. Chambourcin is a very healthy vine with few viticultural problems. Vine leaves turn red quite early, but this does not seem to be a problem. Chambourcin canes are a little more subject to wind damage than other varieties. In strong winds, some heavy canes actually break off.

PW: When are the grapes picked?

We try to let Chambourcin hang until the last week in October, but we have gone as long as November 5. By then, grapes usually reach 19-20° Brix and TA about 0.9-1.0. Since our Chambourcin barely ripens, even in good years, we let it stay on the vine until weather conditions would not benefit the variety any longer. For blending into the 1980 wine, Cabernet Sauvignon was picked October 30 at 19.4° Brix and 1.06 TA.

PW: How is the wine made?

If the TA is greater than 1.2, we add three grams/litre calcium carbonate. If you get the TA down immediately, you encourage malolactic fermentation that will lower the acidity, decrease fruitiness and add complexity. We punch-down the cap two times/day, and press for a total yield of 166-168

gallons/ton when the cap begins to fall apart—usually at 2-3° Brix. First racking is done in mid-December. We will rack in April and then once/year after that.

The 1980 Chambourcin was aged for 16 months in 2 to 4-year-old American oak after it had been in stainless steel for two years. The final blend of 10% Cabernet Sauvignon for the 1980 wine was made at bottling. The Cabernet Sauvignon was placed in American oak immediately after fermentation and remained there the entire time. The 1982 wine went right from the fermenter to a combination of new and 3-4 year-old used, decharred American oak barrels for about 12 months. Topping is every 2-3 weeks without SO₂ adjustment. We occasionally filter before cooperage, but most often at bottling. The decision is based on wine clarity. We filter with a nominal 0.75µ filter or a 0.45µ two-stage filter cartridge.

ST. JULIAN WINE COMPANY

PW: Describe your style:

Chas Catherman: Since 1982 was our first effort with Chambourcin, we did not know what to expect. We produced it in what I would call a modified classical style for red wine—ferment to dryness, one week skin-contact time, and following all the standard rules for red wine except including all stems with the skins, something we don't do with other red hybrids.

I tried several Chambourcins made by wineries in Ohio and Pennsylvania and I was impressed. When we were able to get some grapes from the lone-producing Chambourcin vineyard in southwestern Michigan, I was anxious to try my hand. We are still looking for the correct red grape for the east and mid-west regions. The single, biggest fault with red hybrids is their lack of tannin. Chambourcin has better tannin. As a young wine, Chambourcin has a Beaujolais character and lacks what we call 'toxic hybrid taste'—a very herbaceous, offensive grassiness that comes through along with unpleasant stemminess.

All of the 1982 Chambourcin was purchased by a Kalamazoo restaurant, Oakley's at the Haymarket. The owners were impressed with the style, fruity yet dry, and better than any hybrid red they had tried previously. They relate the style to a Beaujolais and recommend it with Beef Wellington, medallions of veal with imported morels, broiled lamb chops, tenderloin of beef with forest sauce, roast Long Island duckling or veal with artichokes.

PW: Describe the vineyards:

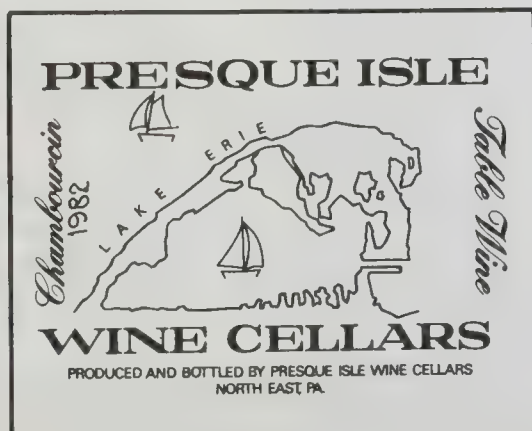
All the grapes came from Lawton Ridge Vineyards, one of the highest elevations in Van Buren County in southwest MI. At approximately 1,000 feet, ½ acre is planted to nine-year-old Chambourcin on six-foot high cordons. 500 vines are spaced 8x9 on a gently sloping hillside with western exposure.

Short cane-pruning, recommended by Philip Wagner, is done along with alternately leaving four, then eight buds/spur along the cordon for a total of 64 buds/vine. This system and some cluster thinning controls crop size to five tons/acre. Soil conditions are sandy to sandy-gravel with very shallow topsoil and pH of 6.5. Subsoil is principally sand. Fertilization is done annually with a standard 30-30-30 mixture of nitrogen, potash, and phosphorus.

Although Chambourcin is one of the last hybrids to bud, between mid-and late May, it is still susceptible to bud damage due to frost, possible until the end of May. Winter injury to buds and canes is evident at time of pruning. In winter, temperatures at -10°F are common on several nights.



Marlene Moorhead
Doug Moorhead



Vine endurance is excellent because any noticeable injury does not seem to affect the crop.

Chambourcin bunches are very large and easy to pick, but the vine as a whole is susceptible to sulfur damage during spraying. Chambourcin appears to have good resistance to both powdery and downy mildew which are always problems in Michigan. We have noticed some powdery mildew, but it can be controlled.

PW: When are the grapes picked?

Chambourcin ripens in mid-to late October. Ripeness is judged by °Brix in the range of 18-20 and general health of bunches. You can't let red hybrids hang much beyond late October in Michigan. We like to see the TA under 1.0 and the pH around 3.0 (the most important factor).

PW: How is the wine made?

Bunches, without destemming, were crushed into an open-top fermenter with addition of 45 ppm free SO₂. The cap was punched down three times/day. Fermentation peaked at 75°F. After six days, we pressed for a total yield of 175 gallons/ton. At this point, fermentation was about 80% complete. After an additional five days in stainless, primary fermentation was complete, and we racked into a new American oak tank where the wine stayed for 10 months. Malolactic fermentation was completed by early December.

We topped monthly, and adjusted the SO₂ to 60 ppm free. We keep free SO₂ at the level required to maintain 80 ppm total SO₂. This varies with pH of the wine. We rack once more prior to bottling, at which time the wine is pad filtered.

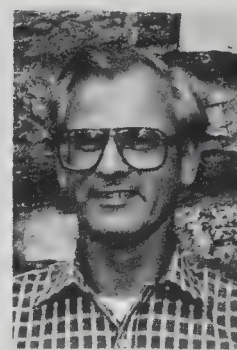
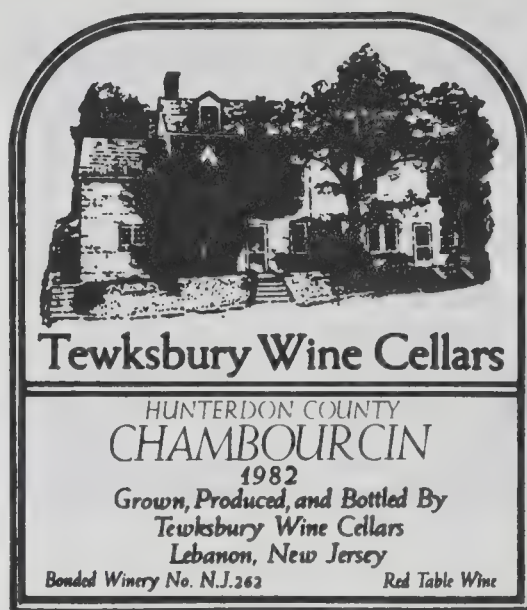
TEWKSBURY WINE CELLARS

PW: Describe your style:

Dan Vernon: I like to think of Chambourcin as the French hybrid version of Cabernet Sauvignon. It has more vinifera qualities than any other French hybrid. It is fruity, but can take oak ageing for added complexity. Just as with Cabernet Sauvignon, I like to serve it with Chevre, Gorgonzola or roast duck. When young, the wine has good color and the aroma of black currants, is tannic and needs bottle ageing. It begins to change dramatically after only three months in the bottle and continues to improve for an additional 3-5 years.

PW: Describe the vineyards:

Our Chambourcin is estate-grown on five acres located three miles north of Olkwick, NJ, in Hunterdon County. The



Dan Vernon

six-year-old vines are planted 790 vines/acre, spaced 9x6 between 650-and 850-foot elevation. Half the site is flat; the remainder is southwestern exposure hillside with 5-15% slope. We have not noticed any quality difference in wine made from the different sites, and we have not separated the grapes to make single lot wines.

We use a two-trunk cordon at 40 inches with a three-wire catch system for spurs. We chose this system for ease of pruning and reduced labor costs on both pruning and tying because no shoot positioning is needed. We prune to 6-8 spurs/cordon with 2-3 nodes each. We leave from 20-30 buds depending upon vigor and amount of ripened wood produced in the previous growing season. Crop size is controlled strictly by the number of buds left at pruning. Average yield is 5-5.5 tons/acre.

Soil is deep, stony loam with a high limestone content, and pH of 6.5. The topsoil is 4-8 feet deep and the subsoil is coarse and stoney with both high iron and limestone content and a small amount of clay. We fertilize annually with 60 lbs nitrogen/acre. In addition, we will add both phosphorus and potassium plus any micronutrients to correct deficiencies shown after petiole analysis.

Our region has 2,600+ degree days—more than enough to ripen Chambourcin. Annual rainfall averages 44-47 inches with 3-4 inches/month during the growing season. Winter lows dip to -12°F, but only for a few hours without any damage to this variety. Frost damage to buds can occur up to May 7. Bud break is mid-May, berry set early June, and veraison the first week of August.

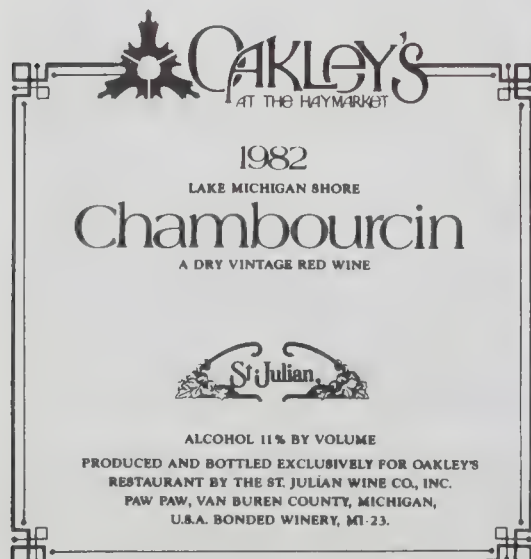
PW: When are the grapes picked?

We begin picking in late September through the first week in October and look for the following criteria: 20-21.5° Brix, 1.0-1.3 TA and 3.0-3.2 pH. When birds begin to eat this variety, we know it is ripe!

PW: How is the wine made?

We add from 0-50 ppm SO₂ at crush depending on how clean the bunches appear. Fermentation on the skins is 36 hours to no longer than 2.5 days. We pump-over 2-3 times/day. We press when we get the color we want. We are not looking for a wine with high tannin. Total yield is 180-185 gallons/ton.

Primary fermentation completes in stainless in 7-10 days. Wine is racked off the yeast lees at this time and then twice more. We fine immediately after the second racking, usually with both Sparkaloid and bentonite. The wine is placed in



Chas Catherman

70% new and 30% two-year-old American oak for 10-15 months. We top every 3-4 weeks and maintain free SO₂ levels at 25-35 ppm. Ahead of the filler, we do a medium pad filtration.

TRULUCK WINERY

PW: Describe your style:

Jim Truluck: Our Chambourcin is fruity with hints of oak. To insure color intensity, we use a 3% field blend of Colobel. When released, about 18 months from harvest, the wine shows a high acid balance. Acidity becomes better balanced with about two years bottle age. After that, the wine mellows and develops a Zinfandel-like finish. Cellaring potential is approximately eight years from harvest. Chambourcin ages better than any other red French hybrid, and is particularly suited to lamb and veal dishes with a mushroom-wine sauce.

PW: Describe the vineyards:

We own 16 acres of Chambourcin vines, ranging in age from 7-12 years, in Florence County, Pee Dee section of South Carolina. This is the northeastern corner of the state, 10 miles south of the 38° latitude. Soil is alkaline, well-drained sandy loam, with 4-5% organic material, and 18 inches of topsoil. Subsoil is sand-clay. We fertilize the vineyards yearly with decayed grape residues only.

90 feet above sea level, 430 vines/acre are spaced 10x10 on principally flat land. We use a six-foot-high trellis with two top wires to keep bunches as high in the air-flow as possible. Plantings are on an east-west axis because prevailing summer winds are from the southeast. We chose this system because of our abundant 42-inch annual rainfall, 16-30 inches during the growing season, and high summer humidity. We cane-spur prune leaving 3-4 buds/cane with a total count of approximately 25 buds/vine. Our crop yield of 3.2 tons/acre is controlled only by our pruning method.

Our vineyards are classified as Region V. It takes 80 days from berry set, occurring in mid-May, for the grapes to reach full maturity in our region. Winter lows can be between 5-10°F, but normal lows are between 20-30°F. No cold damage has occurred to our Chambourcin. Frost danger period is from bud break in late March until approximately April 15. Veraison occurs in late June. We have found Chambourcin to be very susceptible to black rot if a proper spray schedule is not maintained.



Jim Truluck

SOUTH CAROLINA

Chambourcin

1982

A dry red wine with a taste of oak, lightbodied and delicate. A perfect complement to hearty foods.
Alcoholic Contents 12% By Volume



GROWN, PRODUCED AND BOTTLED BY

Truluck Vineyards

BW-SC-8, ROUTE 3, LAKE CITY, SOUTH CAROLINA, U.S.A.

PW: When are the grapes picked?

In our region, Chambourcin can be picked between August 1-15 in most years. We look for Brix readings between 18.5-23°, TA 0.9-1.0 and pH right around 3.3.

PW: How is the wine made?

At crush, we generally add 25 ppm SO₂. Fermentation is carried on for a period of 7-10 days at temperatures between 75-85°F. The cap is pumped over twice daily by using a 3-inch must pump for 30 minutes.

Pressing is done at 3° Brix and the total yield is 160 gallons/ton. First racking off the gross lees follows in four weeks. After the third and final racking, the wine goes into detartration for 4-6 weeks, and then into new and two-year-old Limousin oak for 1.5 years. Topping is done every 3-4 weeks and adjustments are done to maintain 30-40 ppm free SO₂. Before bottling the wine is coarse and sterile filtered.

REFERENCES

Galet, P., *Precis d'Ampelographie Pratique*, Imprimerie Paul Dehan, Montpellier, 4th edition, 1976.

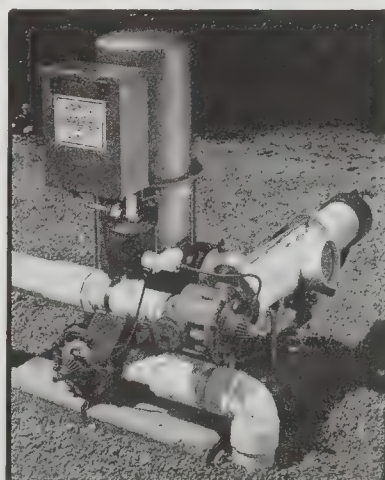
Galet, P., *A Practical Ampelography*, Cornell University Press, Ithaca, NY, 1979.



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CHAMBOURLIN WINEMAKING SUMMARY

JULY-AUGUST 1985

Winery	Harvest Criteria	Stems in Fermentation	Fermentation Yeast/Length Peak Temp.	Cap Management	ML Bacteria Introduction	Time & Type Cooperage	Treatments	Blending Varietal	Finished Wine Statistics
Cedar Hill Wine Company <i>Tom Wykoff</i>	19.5-22° Brix 1.0-1.1 TA 3.0-3.2 pH	None	2% freeze-dried Pasteur Champagne 10-14 days/65-95°F	Punch-down 4-5/day	Automatic	12-24 months new + used decharred whisky barrels; 10% blend European oak 4 months	0.45μ filter at bottling	None	12% alc 0.7 TA 3.6 pH 0.07-0.1 VA 30ppm free SO ₂
Chaddsford Winery <i>Eric Miller</i>	Reserve: 20-23° Brix about 0.9 TA 3.3-3.4 pH	100% including partial whole berry	3% freeze-dried Ca. Champagne or Montrachet 75-80°F/2 weeks	Punch-down 2/day until 3° Brix then once/2-3 days	Inoculate with PSU-1 at start of primary fermentation	6-12 months new + 3-year-old Amer. oak	tight pad filtration	None	12% alc 0.76 TA 3.73 pH, 0.04 VA 40 ppm free SO ₂
Regular:	over 15° Brix 0.9-1.0 TA 3.15-3.35 pH	30%	same in 8 days	same until 8° Brix, then 1/day	same	2-3 days Oakmor	Chaptalize to 22° Brix; ameliorate up to 10%; same filtration	None	11.8% alc 0.59 TA 3.68 pH, 0.059 VA 53 ppm free SO ₂
Grand River Vineyard <i>Bill Worthy</i>	20-22° Brix 0.9-1.2 TA 3.3-3.5 pH	None	0.5-1.0% liquid Pasteur or Assmannshausen 5-7 days/80-85°F	Punch-down 3/day	Automatic	18 months new + used decharred whisky + new Amer. oak barrels	blend after ML completion; pad filtration	33% Leon Millot	12% alc 0.7 TA 3.6 pH
Hillcrest Winery <i>Joe Policastro</i>	17.5-18.5° Brix 1.2-1.5 TA	None	1 gram/gal freeze-dried Montrachet 5-7 days/60-68°F	Punch-down 2/day	Automatic	14 months new Amer. oak	4-8 egg whites/100 gal; 0.5μ pad filtration	1% Leon Millot	12.5% alc 0.724 TA, 0.022 VA 175ppm free SO ₂
Naylor Wine Cellars <i>Dick Naylor</i>	Regular: 20-22° Brix 0.85-1.0 TA 3.15-3.25 pH	Cabernet Sauvignon stems	2% liquid Pasteur Red 8-12 days/65-80°F	Punch-down 3 or 4/day	Automatic	12 months new + used Amer. oak	medium cartridge at bottling	None	12% alc 0.74 TA 3.52 pH, 0.07 VA 45 ppm free SO ₂
Reserve: blending variety	20-22° Brix 0.9-1.0 TA under 3.2 pH	same	same	same	same	+ 6 months in 2.5-year-old Limousin + Nevers oak	blend before oak ageing; same filtration	Cabernet Sauvignon 4-10%	12% alc 0.063 VA 45 ppm free SO ₂
Presque Isle Wine Cellars <i>Marlene/Doug Moorhead</i>	19-20° Brix 0.9-1.0 TA blending variety: 19-20° Brix 0.9-1.1 TA	None	freeze-dried Pasteur Champagne or Montrachet 2 weeks/35-65°F	Punch-down 2/day	Automatic	16 months 2-4-year-old Amer. oak or new + used decharred Amer. oak 12 months	1-2 oz/ton enzyme at crush; blend at bottling; 0.75μ or 2-stage 0.45μ cartridge filter	Cabernet Sauvignon 10%	0.65 TA 35 ppm free SO ₂

Winery	Harvest Criteria	Stems in Fermentation	Fermentation Yeast/Length Peak Temp.	Cap Management	ML Bacteria Introduction	Time & Type Cooperage	Treatments	Blending Varietal	Finished Wine Statistics
St. Julian Wine Company <i>Chas Catherman</i>	18-20° Brix 0.9-1.1 TA 3.0-3.4 pH	100%	1.75 lb/1,000 gal freeze-dried Montrachet 11 days/65-75°F	Punch-down 3/day	Automatic	10 months Amer. oak	pad filtration + 0.45μ sterile filtration at bottling	None	10.7% alc, 0.72 TA 3.6 pH, 0.076 VA 40 ppm free SO ₂
Tewksbury Wine Cellars <i>Dan Vernon</i>	20-21.4° Brix 1.0-1.3 TA 3.0-3.2 pH	None	1-kg/1,000 gal freeze-dried Epemay 7-10 days/55-70° F	Pump-over 2 or 3/day	Automatic	10-15 months 70% new + 30% 2-year-old Amer. oak	50 gram/1,000 gal enzyme; 2-lb/ 1,000 gal bentonite + Sparkaloid; medium pad filtration	None	12% alc, 0.082 TA 3.6 pH, 50 ppm free SO ₂
Truluck Winery <i>Jim Truluck</i>	18.5-23° Brix 0.9-1.0 TA 3.2-3.4 pH	None	1-lb/1,000 gal freeze-dried Montrachet 7-10 days/75-85° F	Pump-over 2/day	Automatic	18 months new + 2-year-old Limousin oak	coarse pad + sterile pad filtration	3% Colobel	11.5% alc, 0.63 TA 0.054 VA, 60 ppm free SO ₂



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TASTING NOTES

Jack Foster, Cedar Hill Wine Co., OH
Eleanor Heald, PRACTICAL WINERY
Ray Heald, PRACTICAL WINERY
Dana Keeler, Hermann J. Wiemer Vineyard, NY
Doug Moorhead, Presque Isle Wine Cellars, PA
Marlene Moorhead, Presque Isle Wine Cellars, PA
G. Hamilton Mowbray, Montbray Wine Cellars, MD
Dick Naylor, Naylor Wine Cellars, PA
Don Neel, PRACTICAL WINERY
Joe Policastro, Hillcrest Winery, PA

1982 Presque Isle, Pennsylvania

Comments before the unveiling:

Wykoff: Right now, the wine is a little dumb. It's got a long way to go. It is going to be an excellent wine and will improve dramatically.

Naylor: More skin contact and stems would have helped it.

Wykoff: This is something we should discuss about Chambourcin. It is deficient in tannin, regardless of what you do, when compared to other classical wines.

Neel: Has any winemaker here added back stems?

Naylor: Yes, about 50%.

Foster: We've done as much as 50%.

Wykoff: Stems need to be brown for nice tannin increase. If they're green, you get a vegetative character.

Neel: We're not talking whole cluster—strictly stem return?

Naylor: Yes.

Comments after the unveiling:

Neel: Marlene, how soon was this wine pulled off the skins?

M. Moorhead: 6 days after inoculation. Fermentation finishes in another 2-3 days.

Neel: Are you happy with the color of this wine?

M. Moorhead: It would not matter if it had been on the skins longer. It would not have picked up more color. I would like to see more color.

Neel: Did you add back stems?

M. Moorhead: No. I am not real happy with this wine.

Keeler: That's because it is not a fully developed wine. There's ML complexity in there and other components that need to harmonize. The thinness will not be there once that happens.

Color/Aroma: Deep purple-red. Earthy, wet leaves, slight barnyard, vinous.

Flavors: Berries, cherry Kool-Aid, tart. Varietal, but not intense.

Balance/Finish: High acidity, balanced tannins, moderately astringent. Flat middle. Short finish. Needs time. Presently too rough.

Jim Truluck, Truluck Winery, SC
Tom Wykoff, Cedar Hill Wine Co., OH

(Winemakers interviewed were invited to submit a sample of 1982 Chambourcin and, where possible, an older vintage. Wines are listed in the order they were tasted and discussed.)

PRACTICAL WINERY thanks Au Provence Restaurant, Cleveland Heights, OH, and the owner, Tom Wykoff, for hosting the tasting.

1983 Chaddsford Reserve, Pennsylvania

Comments before the unveiling:

Policastro: It came across well, but had a thin finish because the acid disguised it.

Naylor: I'd say it's an '83 wine. It's extremely young.

Wykoff: That was my comment too. I'd also like to see more wood in this wine. With this varietal, wood adds a lot.

M. Moorhead: I did get a tannic finish in this wine, and I did pick up some oak.

Keeler: Acid was a little short, but there was enough tannin to carry it. It is balanced. It's rich and supple at this point.

Mowbray: Nice fruit and tannin, just a little young.

Color/Aroma: Deep red-purple, garnet. Raspberries, cherries, varietally characteristic.

Flavors: Lots of oak, good extract, ML character still showing, berry-like, mildly intense and winey.

Balance/Finish: Well-balanced. Long finish with oak dominating. Rounds out in mouth, tannic, should age well.

1982 St. Julian, Michigan

Comments before the unveiling:

Wykoff: That's my style of wine. That's Burgundian and it's going somewhere. It's going to be a long-lived wine.

M. Moorhead: Barnyard.

Wykoff: Beautiful ML complexity, a vinous wine, intense nose, that's the kind of wine I like to make. I like the wood in there. It's a good wine. Some of it should be put away for 10 years. I wish I could say that I made it.

Color/Aroma: Deep, inky purple. Cigar box, barnyard, violets, cedar, peppery, vinous.

Flavors: Low acidity, cedary. Prevalent fruit wedded to oak, peppery, spicy, metallic.

GRAPE INTELLIGENCE

Summary of California Grape
Statistics and Projections 1976-1990

20 Varieties - 9 Regions

Subtotals and Combinations

Including Acreage, Production, Prices,
Yield Per Acre, Variations from Normal,
Written and Graphic Analyses



WINE INTELLIGENCE

Quarterly California Wine Industry
Shipment Report

Industry Summary
25 Individual Companies

5-Company Subgroup by Region and Size

Comparative Data: 1980 - Current

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Balance/Finish: Long finish with slight VA. Cabernet Franc character.

1982 Cedar Hill, Ohio

Comments before the unveiling:

Naylor: Perfect balance. It should be cellared for a few more years.

Wykoff: I suspect it's going through bottle sickness. It was a much fuller wine after 45 minutes in the glass.

Mowbray: A little acidic finish right now, but that will improve.

Comments after the unveiling:

Foster: '82 was the first time we used 50% stems.

Wykoff: This is the first time we used French oak for a red hybrid.

Color/Aroma: Rich, deep, dark purple. Raspberry fruitiness with depth. Dumb now, but will improve in bottle.

Flavors: Berries to black pepper. Youthful, but concentrated. Brambly, blackberries.

Balance/Finish: Well-balanced. Finishes slightly acidic. Tight, firm, young wine, well-composed showing depth potential.

1983 Chaddsford, Pennsylvania

Comments before the unveiling:

Policastro: It's light and thin.

Neel: Is this a different style?

Policastro: It's just the style the winemaker tried to capture. I don't think it had much skin contact.

Wykoff: It's a dry rosé.

Foster: Color is deceptive. It has good structure.

Mowbray: I think it suffers from overuse of sulfur.

Wykoff: It's light and similar to some Italian wines.

Comments after the unveiling:

Keeler: Eric Miller used two different approaches.

Wykoff: I'm confused because I think we used grapes from the same vineyard and my '83 is inky.

M. Moorhead: You didn't get grapes from the same vineyard, Tom. There is a lot of variation with this variety from vineyard to vineyard.

Color/Aroma: Light ruby-red. Very fruity, strawberries, hint of oak.

Flavors: Mild, smooth, berry and oak hints, varietal in light style.

Balance/Finish: Light, uncomplicated, pleasant.

1982 Tewksbury, New Jersey

Comments before the unveiling:

Foster: Heavy fruit, beautiful raspberries.

Neel: Is this a young wine and a little closed at this point?

Wykoff: I get a peppery character and I recognize this as varietally characteristic of Chambourcin. This is the character that makes it similar to a Rhone wine. Very ripe fruit.

Naylor: Best of the flight.

Comments after the unveiling:

Policastro: Starts out berry and finishes peppery.

R. Heald: The vines were planted in 1979. These are young vines.

Wykoff: Does that increase the peppery character?

Naylor: I've noticed it in southern PA fruit.

Color/Aroma: Deep purple. Complex with some barnyard, mushrooms, earthy, oaky, sour-dough.

Flavors: Berry fruit, slight peppery nose, opens up in glass, nicely oaked.

Balance/Finish: Good body and finish, acid a bit short, but nicely complemented by vanilla, oak and tannins.

1982 Grand River, Ohio

Comments before the unveiling:

Naylor: Most European in character. Very Burgundian.

Wykoff: I thought it was tired. Thin body, low tannin and not going anywhere.

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M. Moorhead: High VA after it sat in the glass.

Keeler: It either needs more age and/or more oak to finish it.

Wykoff: Let's go back to the color. This is the first wine that isn't purple. This tells me that this wine has been oxidized somewhere along the line. It's virtually impossible to get rid of the purple color of Chambourcin.

Comments after the unveiling:

Naylor: Are these estate grapes?

E. Heald: It's a blend with 1/3 Leon Millot, all from Worthy's vineyards.

Color/Aroma: Burgundian red, garnet. Slight eucalyptus, complex cherry and red raspberry, high VA.

Flavors: Rough, country style with good fruit in the mouth.

Balance/Finish: Well-balanced, tart, slight astringency, moderately long finish.

1982 Truluck, South Carolina

Comments before the unveiling:

Foster: Distinctive cherry aroma. Good finish with some wood.

Wykoff: A little ethyl acetate showing, but a complex wine that is intensely varietal. A terrific food wine with good potential.

Keeler: Hickory smoke character which covered fruit for a while, then black raspberries came through more than cherry. Finish is a bit short and tart.

Naylor: Best tannin so far.

M. Moorhead: Barnyard, Burgundian foul, or whatever we're calling it, is in here. I didn't get ethyl acetate and I usually catch it.

Color/Aroma: Deep, dark purple with jammy aromas, slight ethyl acetate, smokey, hickory-like.

Flavors: Hot skillet, Cabernet Franc, strong old oak, spicy, peppery.

Balance/Finish: Good balance and moderate finish. Still young, somewhat green and tannic, showing good ageing potential.

1982 Naylor Reserve, Pennsylvania

Comments before the unveiling:

Wykoff: I'm picking up ethyl acetate in this one, too. However, I'd like to taste this wine in 10 years.

Mowbray: This one will age.

Comments after the unveiling:

Naylor: It's still in Limousin oak. Ever since we put it in Limousin oak we have topped with Cabernet.

Keeler: It's nicely balanced.

Wykoff: Very complex.

Color/Aroma: Opaque purple, inky. Very varietal, peppery, berry fruits.

Flavors: Slight VA, oak, black cherries, intense fruit, newly bottled wine, new wood.

Balance/Finish: Full, complex, long finish, but needs more time to come together, interesting wine, luscious.

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1982 Hillcrest, Pennsylvania

Comments before the unveiling:

M. Moorhead: Both this and the last wine were, in many of the same ways, complex, full, and really nice.

Naylor: Apples and raspberries in the nose.

Wykoff: Most drinkable wine in this flight.

Naylor: Drink it now.

Moorbray: As it develops more bottle bouquet, it will be a dandy wine. It has nice flavors and good fruit. Taste is a lot better than aroma right now.

Comments after the unveiling:

PolICASTRO: These are the same grapes from the same vineyard as the first wine we tasted. On new American oak for 9 months. Fined with egg whites.

Wykoff: Tell me about your ML.

PolICASTRO: Natural.

Wykoff: Was the American oak Bluegrass or A & K?

PolICASTRO: Bluegrass.

Color/Aroma: Deep purple. Attenuated aroma, apples, woody, cedary.

Flavors: Berries, spice, grapey, vinous, good depth of flavors.

Balance/Finish: Soft, forward, drinkable, well-balanced, great style.

1982 Naylor, Pennsylvania

Comments before the unveiling:

D. Moorhead: Very aromatic, pleasing flavor, but somewhat astringent, thin, and bitter.

PolICASTRO: Needs a bit more ageing.

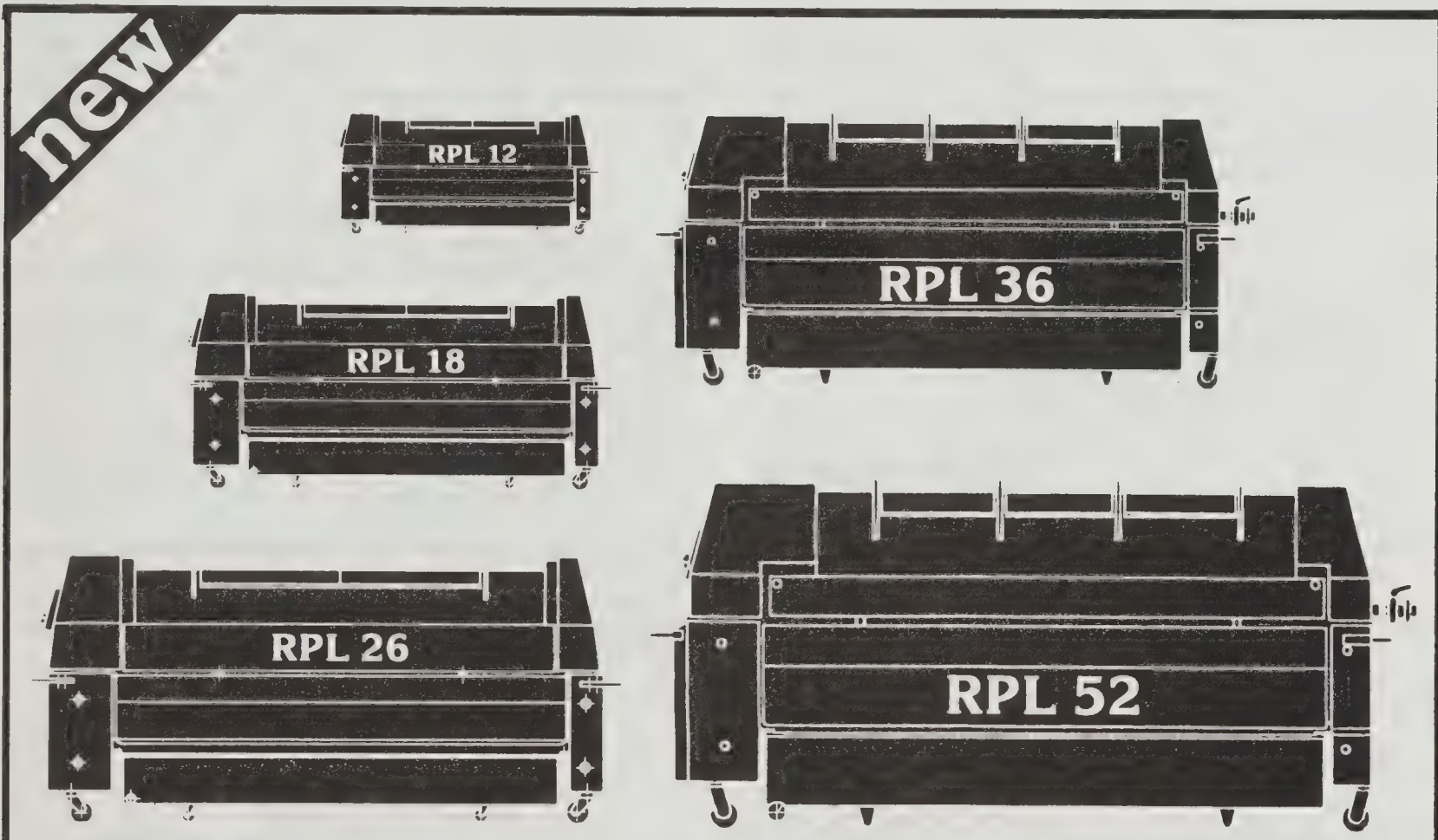
Wykoff: I think it's from relatively unripe grapes and has been chaptalized.

Naylor: Same grapes as the Reserve wine.

Comments after the unveiling:

Wykoff: I was wrong; those aren't unripe grapes.

E. Heald: Will you explain what you do with the Reserve to make it different from the regular bottling?



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Naylor: This was in American oak only, and has been bottled for 4 months. Reserve wine gets Limousin treatment in addition.

E. Heald: Which American oak?

Naylor: Bluegrass.

R. Heald: Don't you also have more Cabernet in the Reserve wine?

Naylor: Yes, because of topping up with Cabernet.

Color/Aroma: Deep, opaque, inky purple. Cigar box, barnyard, coffee, raspberries, light varietal Chambourcin.

Flavors: Peppery, pleasing, but somewhat astringent, rustic, full, oak, round feel in mouth, rich.

Balance/Finish: Drinkable now, but will improve with age. Well-structured, good tannin, balanced, full finish.

1981 Truluck, South Carolina

Comments before the unveiling:

Foster: Beautiful fruit and nice toastiness—a good marriage with the wood. Finish is very clean.

Mowbray: Better fruit flavor than what's in the nose.

Wykoff: I think it's an elegant wine. Superb food wine.

Keeler: More acid than a lot of the others we tasted.

Comments after the unveiling:

Truluck: This wine just had a car ride up from SC.

Wykoff: I'll take any that you have left in the trunk! This wine has great ageing potential.

Color/Aroma: Deep purple-red. Cinnamon, spicy, barnyard.

Flavors: Peppery, berries, better fruit taste than aroma, wood starting to marry with fruit.

Balance/Finish: Some bitterness, fruit lingering in aftertaste.

1981 Tewksbury, New Jersey

Comments before the unveiling:

Policastro: Nut flavor—almond, toast, barrel coming through.

Naylor: Fruitiest of any we've had.

Wykoff: It has the same pepperiness that we talked about before.

Mowbray: Almost dusty, pepper.

D. Moorhead: It has a salty, metallic taste.

Comments after the unveiling:

Wykoff: Does anyone know if that's an area where the grapes come in very ripe? Is that where the peppery quality is coming from?

R. Heald: The other wine from Tewksbury was peppery also.

Neel: Stats don't reveal terribly ripe.

R. Heald: I've heard some objection toward Chambourcin that it has a salty taste, and I noticed that it wasn't until this wine that anyone brought it up.

D. Moorhead: I find that a pleasurable part of it.

R. Heald: Do you really think that Chambourcin has a salty, metallic taste?

D. Moorhead: Ours often does.

Color/Aroma: Deep purple. Intense, varietal, peppery nose. Grassy, dusty, black cherries, complex.

Flavors: Cherries, but needing more oak. Red raspberries.

Balance/Finish: Hot finish. Needs more bottle age. Fast finish, wine at peak now, quaffable.

1980 Presque Isle, Pennsylvania

Comments before the unveiling:

Naylor: This is the first wine that smells like a red hybrid.

Foster: I get asparagus.

Neel: I like that, now you have to wait for bell pepper.

Naylor: I think it was treated to drop the acid.

Wykoff: If you look at the color, it's on the brick side, so this is probably an older wine. It's thin and has not aged well. It's not going anywhere.

Naylor: It's not varietal in character.

Comments after the unveiling:

D. Moorhead: We left it in stainless for two years before it went into oak. Dick was correct. We had to reduce acidity with calcium carbonate.

Neel: Was the two years in stainless out of logistical necessity?

D. Moorhead: Yes.

Color/Aroma: Brick, aged color, losing color intensity. Vinous, light fruit, asparagus, low varietal character.

Flavors: Integrated, but not outstanding. Thin, uncomplicated, lighter style.

Balance/Finish: Has not aged well, over the hill, not distinctive, acid bite.

1975 Cedar Hill, Ohio

Comments before the unveiling:

Naylor: This is like several of the other wines will be in another seven years.

Keeler: It's starting to come together and is showing a slight oxidative fruit character that comes with age. It's an elegant wine.

Policastro: Agreed.

Mowbray: Good fruit.

Comments after the unveiling:

Wykoff: This wine was aged in 30-gallon charred whisky barrels. We made a total of 200 gallons of Chambourcin that year. The grapes came from Bill Worthy's vineyard. That year, I bought his entire crop. The vines were three years old—the first crop.

Color/Aroma: Deep purple. Full Chambourcin varietal character, complex, cedary, raspberries, barnyard and fruit.

Flavors: Complex and together, warm, full, good oak.

Balance/Fruit: Fruit, tannins, oak, and acid well-integrated. Excellent, where Chambourcin should be going.



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Yeast Guide

PRACTICAL WINERY has surveyed suppliers to prepare this listing of yeast, malolactic bacteria, and nutrients available for the 1985 harvest to assist fermentation decisions. There is a wide range of yeast strains available, especially as Active Dry Yeast. Research is stressing the importance of proper inoculum levels, nutrients, and growth conditions, thus emphasizing the importance of planning and careful yeast handling. Contact individual suppliers for recommendations and technical information or assistance. PW reminds winemakers to order all items as early as possible.

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Active Dry Yeast

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Epernay 2, Available in 1-kg tin
Manufacturer: GB Fermentation Inc.
Fermivin, Available in 450-gm or 10-kg package

Yeast Nutrient

Manufacturer: Red Star—Available in vial of 15 tablets, 1/4-lb bottle (200 tablets), 5-lb bottle, or 25-lbs

SEE OUR AD PAGE 36

CRIVELLER COMPANY
6863 Lundy's Lane, Niagara Falls, Ontario (416) 357-2930

Offers granular dry yeast in vacuum bags of 1/2-kg, manufactured by AeB Brescia, Italy in cooperation with the Oenological Research Dept. of the Bologna University. No minimum quantity, same day shipping.

AeB ZYMASIL (*Saccharomyces cerevisiae*)—For fermentation of grape juices and grape dregs. Dosage: regular fermentation: 5-10 gr/hl; difficult fermentation: 20-40 gr/hl.

AeB Zymasil Bayanus (*Saccharomyces bayanus*)—For fine wine making, low temperature fermentation and specifically for the Champenoise or Charmat method. Dosage: fine wines: 10-20 gr/hl; Charmat or Champenoise: 20-40 gr/hl; Stuck fermentation: 30-50 gr/hl.

Yeast Nutrient

Manufacturer: AeB ENOVIT—Offers vacuum bags of 1-kg; dosage of 15-30 g/hl.

SEE OUR AD PAGE 12

ETS
1204 Church St., St. Helena, CA 94574 (707) 963-4806

Yeast Cultures in Liquid Media

Aussmannshausen, UCD 679
Saccharomyces cerevisiae, (strain Burgundy), UCD 51
Saccharomyces bayanus, (strain Champagne), UCD 505
Saccharomyces bayanus, Institute Pasteur, UCD 595
Saccharomyces cerevisiae, (Eperney), UCD 585
Saccharomyces cerevisiae, (strain Montrachet), UCD 522
Saccharomyces cerevisiae, (strain Steinberg), UCD 529
French White, Institute Pasteur

French Red, Institute Pasteur
Prise de Mousse, Institute Pasteur, UCD 594

Malolactic Bacteria Culture in Liquid Media

Leuconostoc oenos UCD ML 34

Leuconostoc oenos, PSU-1

Yeast or bacteria culture available in 1 liter, order time: at least 4 days prior to pickup or shipping date.

Active Dry Yeast

Manufacturer: Red Star—1-kg tin

Saccharomyces bayanus, (California Champagne), UCD 505
Saccharomyces bayanus, (French Champagne), UCD 595
Saccharomyces cerevisiae, (Montrachet), UCD 522
Saccharomyces cerevisiae, (Eperney 2), Geisenheim

Yeast Nutrient

Available in 1-kg pkg

ETS invites inquiries on cultures not listed.

SEE OUR AD PAGE 44

MOFFETT CO., INC.
6985 Via Del Oro A-5, San Jose, CA 95119

Offers yeast in active dry form, manufactured by Laboratoires Oeno-France; 1-kg tin or 0.5-kg brickpak (Recommendation: place order 6-8 weeks in advance.)

Levuline Alsace (*Saccharomyces cerevisiae*)—Selected by Institut of National de Recherche Agronomique at Colmar, France. For low temperature fermentations, to cure stuck fermentations; for low volatile acids, acetaldehyde and SO₂; complete fermentation. Dosage-white must: 10-20 grams/100l; red vintage: 20 grams/100l.

Levuline CHP (*Saccharomyces bayanus*)—Special yeast for Methode Champenoise developed by the Comité Interprofessionnel du vin de Champagne. For low foam and will ferment to dryness.

SEE OUR AD PAGE 38

NAPA GRAPE & EQUIPMENT CO.
948 Third St., Napa, CA 94559 (707) 252-9555

Active Dry Yeast

Manufacturer: Red Star
Montrachet, UCD 522
Pasteur Champagne, UCD 595
Epernay 2

Manufacturer: Lalvin

Prise de Mousse, Institut Oenologique de Champagne
Wadenswil 27, for cold fermentation.
SB1, Montpellier, high alcohol tolerance.

PICKERING WINERY SUPPLY
1300 22nd St., San Francisco, CA 94107 (415) 821-2400

Active Dry Yeast

Manufacturer: AEB, spa (Italy)

Zymasil (*Saccharomyces Cerevisiae*)—For white wine, red wine, or wine base for champagne. Has low tendency to foam, good ability to flocculate, will not produce H₂S, conversion rate of 0.61. (250-gram bags)

Zymasil Bayanus (*Saccharomyces cerevisiae*), Previous classification was S. Bayanus—For white wine and primary or secondary fermentation of champagne. Has low tendency to foam, excellent flocculation, will not produce H₂S, conversion rate of 0.61. (500-gram bags)

SEE OUR AD PAGE 42

SCOTT LABORATORIES, INC.
PO Box 9167, San Rafael, CA 94912 (415) 457-8460

VI-A-DRY™ Yeasts

Montrachet (*Saccharomyces cerevisiae*), UCD 522—Fast, reliable, low-cost fermentation.

Champagne (*Saccharomyces bayanus*), UCD 595—Clean fermentation, low H₂S, excellent secondary fermentation.

Montrachet and Champagne available in 12.5-kg fiber drum and per pound to order.

Prise de Mousse (*Saccharomyces bayanus*), aka Epernay from l'Institut Oenologique de Champagne—Very viable, hardy, fast pressure build-up to 6 atmospheres, ferments well at low temperature (to 10°C), flocculates well.

K-1 (*Saccharomyces cerevisiae*), from Université de Montpellier—Fast starting killer factor inhibits wild yeasts, ferments under most difficult conditions including stuck fermentations.

71 B (*Saccharomyces cerevisiae*) from Universite de Narbonne—Isolated from flor in the Beaujolais region. Selected for production of 'fruity' aromatic compounds. Indicated for 'Vin Nouveau' wines or others where maximum fruitiness is desired.

Wadenswil (*Saccharomyces cerevisiae*), from Swiss Nat'l Agricultural Station, Wadenswil—Slow, cool, low-foaming fermentation, extremely low H₂S, assists ML fermentation. Recommended where no fermentation temperature control available.

Prise de Mousse, K-1, 71 B, and Wadenswil available in 500 gm tin.

LEUCOSTART™ (*leuconostoc oenos*)

Pure freeze-dried PSU-1 strain. Clean ML fermentations even at low pH.

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Yeast Strains

Available on agar slants (16-oz bottle), 7-10 days required to prepare cultures for shipment.

STRAIN

Aussmannshausen, UCD 679

Ay Champagne, UCD 503

BYL Flor

Champagne, UCD 505

Distillers

Jerez #5, UCD 515

Pasteur Red (Bordeaux Red)

Rhine, UCD 526

Steinberg, UCD 529

Tokay, UCD 530

#519 Flor, UCD 519

Zinfandel

SUGGESTED USE

Cabernet Sauvignon,

Pinot Noir, Gamay

Champagne

Flor Sherry

Champagne

Alcohol, Distilled beverages

Flor Sherry

Dry Red, Cabernet, Merlot,

Gamay, Zinfandel

Dry White

Gewurztraminer, Johannisberg Riesling

Dessert Wine

Flor Sherry

Dry Red

Yeast Nutrients

Yeastex-61 available in 25-lb box or by the pound.

Yeast hulls (ghost cells) available in 500-gram packets.

SEE OUR AD PAGE 3

2K PACKAGING ENTERPRISES, INC.

7914 SW Nimbus Ave., Beaverton, OR 97005 (800) 874-9722

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Active Dry Yeast

Manufacturer: SIHA GmbH, from Institute for Microbiology, Technical University of Darmstadt, Fed. Republic of Germany

SIHA-1 (*Saccharomyces cerevisiae*)—For high ethanol yield and suppression of off-flavors.

SIHA-2 (*Saccharomyces bayanus*)—For champagne and sparkling wines, fermentation at high alcohol concentrations and completion of stuck fermentations.

SIHA-3 (*Saccharomyces cerevisiae*) Strain ET 136—For reliable and sensorially pure fermentation.

Available in 500-gram pkg; 20 pkgs of 500-gram form 10-kg pack.

VINQUIRY

301-D East St., Healdsburg, CA 95448 (707) 433-8869

Yeast Cultures

Supplied on agar slants in 400-ml of sterile grape juice medium, assuring viability on arrival. Incubation time for the 400-ml culture is 12-24 hours. Complete propagation and handling instructions provided.

Aussmannshausen, UCD 679

Burgundy, UCD 51

Pasteur Champagne,

UCD 595, Institute Pasteur

California Champagne,

UCD 505

Epernay, Geisenheim

Research Institute

French White, Pasteur Institute

French Red, Pasteur Institute

Montrachet, UCD 522

Steinberg, UCD 529

Steinberg, Geisenheim

Research Institute

Prise de Mousse, UCD 594

Active Dry Yeast

Manufacturer: Red Star—Available in 1-kg tins or 10-kg pkg.

Pasteur Champagne, UCD 595

California Champagne, UCD 505

Montrachet, UCD 522

Epernay 2, Geisenheim Research Institute

Nutrient

Yeast Nutrient, Red Star Yeast Autolysate—1-lb or 25-lb pkg

Malolactic Bacteria

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MCW (*Leuconostoc oenos*) A very fast-growing strain. Low pH and temperature tolerant.

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THE WINE LAB

1200 Oak Ave., St. Helena, CA 94574 (707) 963-7903

Liquid Yeast Cultures

Available in 1-oz, 2-oz, 4-oz, 8-oz, 16-oz, 32-oz, or as 'YEASTER' kit (concentrate packet to make 16-oz liquid culture—has 6-month shelf life). Order at least 5 days before shipment date or 3 days before pick-up.

Aussmannshausen, Geisenheim, Germany—For austere fruitiness, slow fermentation rate, high-pH red musts, and intense color development.

Beerenauslese, Germany—For grapes infected with botrytis to intensify apricot-honey flavors, fermentation can be arrested by chilling and racking.

Chanson, France—For even fermentation of Chardonnay, low H₂S production, flocculates well.

Enoleuvre, Beaujolais, France—For flowery, grapey wines with medium body, its aromatic qualities are suited to carbonic maceration fermentations.

Etoile, France—two sources—For sparkling wine, to produce qualities of subdued yeastiness with crispness, flocculates into large chunks.

Pasteur Red, Pasteur Institute of Paris, a.k.a. Bordeaux Red, French Red—For fast, strong fermentation of complex full-bodied reds.

Pasteur White, Pasteur Institute of Paris—Works best at a slow, even temperature, or is a high foamer at warm temperatures, emphasizes acidity and is appropriate for high-pH whites.

Original German Steinberg, Geisenheim, Germany—For slow, cool, even temperature fermentation of white musts, but is cold-tolerant, must be arrested by chilling and SO₂ addition, fining, racking, or centrifugation.

Y.C. Zinfandel, vineyard, St. Helena, CA.—For very fast and vigorous fermentation, for encouraging high sugar fermentations toward dryness. Color extraction is less than with other red wine yeasts, some cooling is recommended at the peak of fermentation.

UCD #51, (Burgundy), U.C. Davis—Might be used for Pinot Noir or Cabernet Sauvignon.

UCD #594 Pasteur Institute, via U.C. Davis—Very efficient in conversion of sugar to alcohol, suitable for white wines in which tropical flavors are pleasing, can be manipulated to leave some residual sugar.

Active Dry Yeasts

Available by the ounce, pound, or 1-kg tin or 10-kg box.

Manufacturer-GB Fermentation Industries:

Fermivin, Holland—Ferments very rapidly, may help restart a stuck fermentation.

Manufacturer-Lalvin:

Prise de Mousse (by the 1-kg tin or bulk)

Manufacturer-Red Star:

California Champagne, UCD #505, U.C. Davis

Flor Sherry, UCD #519

Montrachet, UCD #522

Pasteur Champagne, UCD #595

Epernay 2

(We invite inquiries on dry Pasteur Red for 1986 delivery.)

Liquid Malolactic Bacteria Cultures

Three strains are available, separately or in combination: 1-oz, 2-oz, 4-oz, 8-oz, 16-oz, or 32-oz. Order at least 5 days before shipment or 3 days before pick-up.

ML-34—Not suggested for use in wines below pH 3.3.

PSU-1, Penn. State University—Vigorous strain for low-pH and white wines, as it can sometimes tolerate a pH as low as 3.1.

STV-200, Burgundy—May accept wine with slightly higher alcohols than other strains.

Combined Culture—Recommended for wines which may be reluctant to support ML growth because of adverse conditions (cold, low pH, high alcohol).

Nutrients

Following are available in bulk quantity:

Yeast Food, YF

Yeastex, YX

Yeast Extract, YE

Yeast Hulls, YH

ML Nutrient



Méthode Champenoise

Bruce Zoecklein

Enologist — Department of Horticulture
Virginia Polytechnical Institute, Blacksburg, Virginia

Cultivar Selections

"Trace we the workings of the wondrous brain, warmed by one bottle of dry champagne." (Lord Houghton 1874)

It would seem that every conceivable grape variety has been used for methode champenoise at some point in time. According to Amerine et al. (1980) one of the primary reasons for the improvement of sparkling wine in the United States has been the utilization of both better cultivars and better site selection.

PW conducted a survey of 16 North American Methode Champenoise producers to determine, among other things, the cultivars currently utilized. This polling included 11 California houses plus one each from New York, Washington, Oregon and Ohio. The results are listed in Table 1.

Grapes used in Champagne are almost exclusively Pinot Noir, Chardonnay and Pinot Meunier. Wasserman (1984) reports that as of 1979 the Champagne district's plantings were 24.4% Pinot Noir, 30.0% Chardonnay and 44.5% Pinot Meunier.

Pinot Noir produces a wine with vinosity, body, strength, firmness, depth and backbone—what the French call carpentry. The other noble grape of Champagne—Chardonnay—is said to give acid, finesse, bouquet, lightness, elegance and freshness to methode champenoise. These generalizations are broad and become nebulous when one considers, for example, that there are 82 different clones of Pinot Noir identified to date in the Champagne viticole (Forbes 1984).

Pinot Meunier is considered a lesser member of the Pinot family, although the percentage in the Champagne viticole doesn't appear to reflect that attitude. In Champagne it produces a base wine more robust with a less refined bouquet

than the Pinot Noir. Its cuvees are less colored than the Pinot Noir with a more obvious, distinctive nose and bigger, broader flavor.

The flavor profile of methode champenoise is composed of three major stimulations according to Puesais 1981: 1) the tactile base influenced by the extract and astringent elements; 2) the acidity which depends upon the cations present, buffering capacity, alcohol and sugar levels; 3) the sugar taste which is produced mainly by the interaction of acid, alcohol and sugar.

Rene Vannetelle, enologist for Pol Roger, has developed a more expansive palate profile to help explain how the three grapes of his region interact in the evolution of his final product. Figure 1 (adapted from Randall 1985) depicts this flavor profile of cuvees of less than 2 years.

Pinot Meunier is broad in flavor but has somewhat muted early perfume and flavor intensity. This variety does not reach the flavor intensity of Chardonnay (in the Champagne region) and is perhaps broader than Chardonnay in the middle palate and then falls away, lacking length, according to Vannetelle. The Chardonnay contributes some perfume and initial intensity, then the Pinot Meunier begins to dominate. The length of the finish of the Pinot Noir begins to completely dominate later in the palate. From Figure 1 it can be noted that Pinot Noir lacks an early forcefulness but gradually gains depth and length to finally dominate. Randall (1985) summarizes Monsieur Vannetelle's palate profile for a young Champagne in Figure 2.

Chardonnay is first detected by the magnitude of its perfume. This is followed by Meunier with mid-palate flavors which are broad. The Pinot Noir finishes with length and intensity.

Figure 1

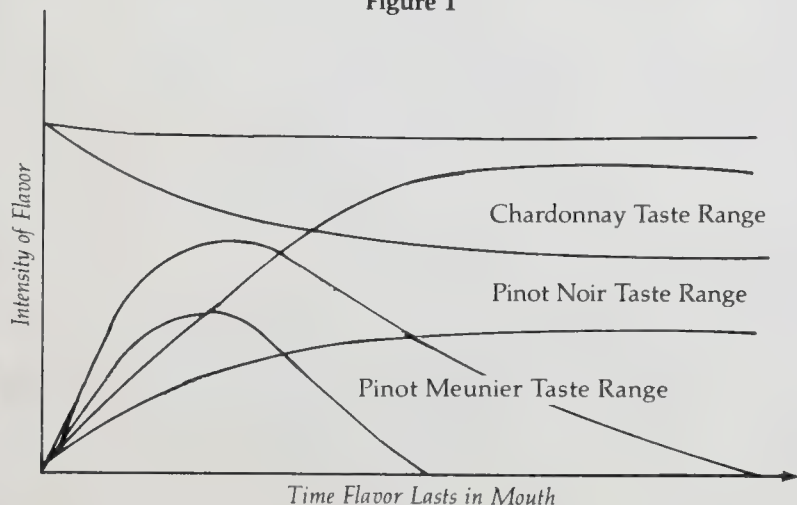
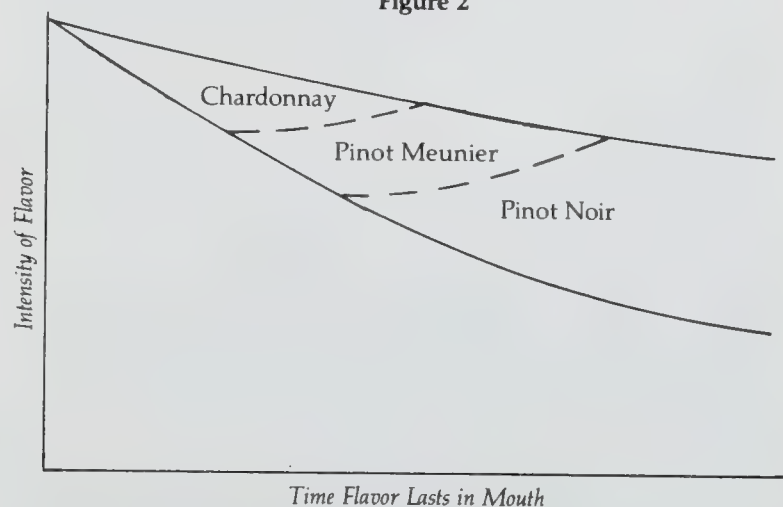


Figure 2



Pinot Meunier ages much more quickly than either Chardonnay or Pinot Noir and as such is often suggested only as a constituent for cuvees designed for limited ageing. Pol Roger N.V. usually Chardonnay, and 40% Pinot Noir (Randall 1985). To distort this generalization, however, Remi Krug reports that their 1976 vintage product just released contains 21% Pinot Meunier, 47% Pinot Noir, and 32% Chardonnay (Walker 1984).

Monsieur Vannetelle suggested that Champagne of three years' tirage ageing has a quite different palate profile (Randall 1985). In such a case the Pinot Meunier develops much more quickly in the mouth but fades rather rapidly. The Chardonnay provides the perfumed intensity. As the tirage age increases, the Pinot Noir increasingly comes to dominate both the nose and the palate.

Among California houses polled there is an interest in Pinot Blanc as a product constituent. Like the Pinot Meunier, this cultivar ages more quickly than Chardonnay yet adds fullness to the middle palate. It is said that Pinot Blanc in California is more like the Chardonnay of Champagne—lending finesse, lightness and flavor (Wasserman 1985). Pinot Blanc is employed to lengthen the finish (Maudiere 1980). This cultivar has a tendency to drop acid quickly on the vine and can produce a wine which is bitter (Dyer 1983). Additionally, Pinot Blanc has a high polyphenol oxidase content which can lead to excessive browning (Berg 1976).

There appears to be significant differences in viticultural areas, clones, vineyard management practices, grape maturity,

processing techniques, etc., to make definitive universal flavor profile statements. It seems apparent that such profile studies would be of benefit to each methode champenoise producer. French winemakers use the analogy that Pinot Noir is the frame, Chardonnay is the picture, and Pinot Meunier is the dressing Champagne. The lack of knowledge as to optimum cultivars, cuvee blends and ageing potential is a particularly acute problem for developing wineries.

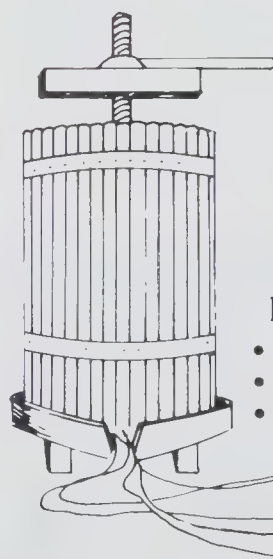
In our survey, we also asked methode champenoise producers what parameters were used to gauge maturity. Table 2 shows a listing of the responses.

It is clear that the majority of those polled do not rely solely on °Brix, titratable acidity, or pH, but use of their overall maturity gauge. Table 3 lists ranges of these parameters used in California for several cultivars. °Brix, titratable acidity, and pH may not be specific indicators of either physiological maturity or potential palatability. These can vary depending upon the season, the crop level, soil moisture, etc. Clearly, maturity must be viewed as a multidimensional phenomena and the results of our survey reflect that attitude.

Most methode champenoise producers desire base wines which do not have extensive varietal character. There must be a careful balance between early harvest to help reduce varietal intensity and the avoidance of immature fruit. Physiologically immature fruit will produce wines which are green, or grassy in aroma. Overly ripe grapes can produce a wine in which the varietal character becomes too assertive or aggressive. Many California M.C.'s are made to be austere, crisp and delicate on the palate while some seek more full-bodied

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Table 1
Currently-used cultivars

Cultivar	California Producers	Non-California
Pinot noir	10	1
Pinot Meunier	1	
Gamay	1	
Chardonnay	11	4
Pinot blanc	8	
French Colombard	1	
Flora	1	
Chenin blanc	2	
Sauvignon blanc	1	
Seyval		3
Vidal		3

Table 2
Harvest parameter employed by 16 methode champenoise houses

Parameter	Value
°Brix	Final alcohol, ease of secondary fermentation, bubble retention, vintage dating considerations
Titratable Acidity	Freshness, ageing potential
pH	Freshness, ageing potential
Aroma Assessment and Taste	Gauge physiological maturity, control varietal character
Grape Condition	Botrytis, powdery mildew, etc.
Vine Condition	Potential for further ripening, etc.
Malic Acid	Life and freshness
Color	Ability to produce a blanc

and complex wines. There is certainly stylistic freedom; however, it is essential to note that the sparkle adds a significant magnifying effect to the odorous components of the wine.

If one defines maturity as that point in time when the grape develops the varietal character and aroma intensity consistent with the type and style of wine desired, then aroma assessment of the juice appears to be a logical maturity evaluation adjunct. Pinot Noir often produces a light, earthy, strawberry aroma. Chardonnay in most areas of California can produce a base wine which is heavy, too rich in varietal intensity, and highly perfumey. Chardonnay produced in the eastern United States has moderate varietal intensity. An evaluation of juice aroma and aroma intensity is a method employed by some to control aroma intensity. With the increased understanding of the role of latent yet potential flavor constituents in the grape, juice aroma evaluations may take on additional importance (Wilson et al. 1981).

More to follow.

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Table 3
Fruit chemistry of some California grapes for Methode Champenoise

	Chardonnay	Pinot noir	French Colombard	Chenin blanc
°Brix	18-19	18-20	17.5-20	17.5-19
Titrateable Acid gram/100ml	1.1-1.4	1.0-1.3	1.2-1.4	1.0-1.1
pH	2.9-3.15	2.9-3.15	2.9-3.2	3.1-3.2

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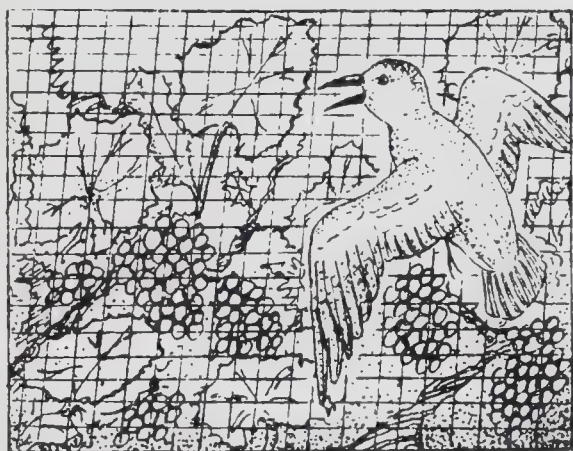
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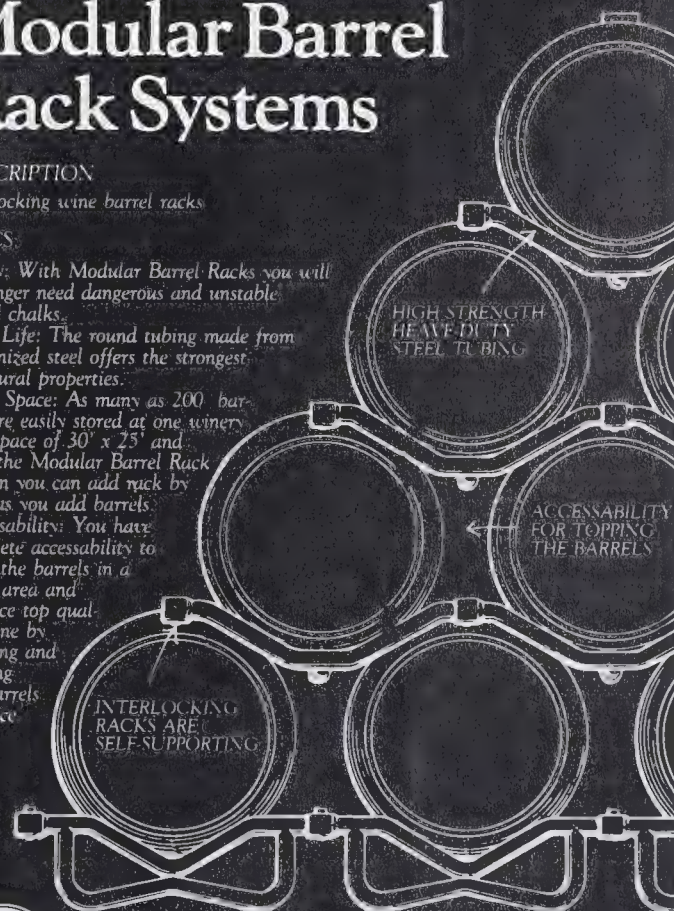
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Wine Unit Costs

George M. Schofield

As with wine quality, wine cost accounting begins with the grapes. The grape is not only the natural starting point, but also the largest cost element of wine, often representing over 50% of the total wine cost and 25% of the wine selling price to the wholesale trade. The basic premise of a wine cost accounting system should be to follow the enological process as closely as possible. More specifically, every effort should be made to parallel the accounting with the winemaking operation.

In the cost allocation process, it is important to maintain common sense. In reality, actual costs are a myth. All costs to some extent are estimates. The tendency is to try to be too precise. As long as estimates are in the middle ground, variations within and between categories, whether on volume or costs, will often tend to offset each other.

One major problem to be avoided is being collectively optimistic in estimating the volume of premium wines. As a result, significant initial over-valuation can occur as wines are subsequently downgraded in classification. The related recording of 'cost to market' loss adjustments is usually an unpleasant occurrence which a little conservatism can prevent.

Grape Cost Summary

The initial step of developing a unit cost for the grape component of wine is to summarize total grape payments by grape variety. In this process, a sublisting by grower may prove useful, particularly where significant costs per ton variations and different utilizations are involved. Exhibit 1 is an example of such an analysis.

Grape Utilization Matrix

Armed with details of tons and cost by variety, the enologist ought to be consulted about grape utilizations. Each major wine program should be identified and a grape utilization matrix (Exhibit 2) developed showing where each ton of grapes was used.

Wine Production Summary

Another vital set of data needed to compute unit cost is production volume data. As soon as practical, most probably around November 30, a complete physical inventory of new wines by tank should be taken. The list of wines by tank should then be reviewed by the winemaker to set up the wines into major quality categories as follows:

- 1) Premium wines suitable for varietal wine.
- 2) Standard wines for generic bottling.
- 3) Wines for bulk wine sales.

Normally, classification of wines into quality categories is simple. Occasionally, a significant degree of uncertainty arises because of the initial presence in some new wines of undesirable flavors or aromas. A refinement aimed at working around this problem is to create a specific 'uncertain' category and then requesting the winemaker to estimate conservatively within this category the percentage of wine likely to be premium. By combining uncertain lots of wines and applying percentages of premium and standard wines, the necessary classifications can be estimated (Exhibit 3).

Wine Program Cost Matrix

The various building blocks of data have been put in place and linked. Correlation of data and production of a grape utilization matrix in dollars is the next step. Very simply, the grape utilization matrix is multiplied by the average grape price value. The result can be seen in Exhibit 4.

Essentially, by adding down the total costs in each column, the total costs of the grapes used in a wine program can be obtained. If this total grape cost is then divided by the wine produced, as summarized in Exhibit 5, a grape cost per gallon can be developed. This cost will reflect the actual mix of grapes used to produce given wines.

Depending on how esoteric a calculation is desired, further refinements can be made. For example, if some very expensive Cabernet Sauvignon grapes are purchased for a reserve

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- Product and Process Research

- Yeast and Bacteria Cultures
- Laboratory Reagents and Supplies
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Cabernet program, another column could easily be added to the wine programs across the top. The Cabernet grape side of the matrix would also be expanded by another category so as to subdivide the high-priced grapes from the balance. In this way, a separate grape cost for 'Reserve' wines can be developed.

Quality Differentiation

The wine inventory of new wines was deliberately designed to identify separate wine quality categories of the same variety. However, the grape value utilization matrix initially results in only a single unit cost for a wine program. To the extent that several distinct wine quality segregations have occurred in winemaking, a related logical need for similar cost differential may also exist.

Joint Product Costs

The accounting concept raised by the quality differentiation is known as the 'joint product' or 'by-product' theory. 'Joint' implies a process where two or more products are produced simultaneously, with at least some intent to produce both. Economics are usually such that either product would be intentionally produced in the absence of the other. The products don't have to be equally desirable, and there may be

significant unit value differences between them. A good example might be a winery producing a primary and a secondary label Cabernet Sauvignon or perhaps designating some of the Cabernet Sauvignon press wine for blending into a generic wine. As the name implies, joint products share costs, if not equally, then on some sort of weighted basis, most normally the relative market value of the joint products.

By-Product Costing

At the other extreme is the by-product which, as its name implies, is not deliberately made. Lees wine is a residual product which is not intentionally produced and which has a market value only a small fraction of the full share of grape costs.

Only when the salvage value is greater than incremental cost of finishing and selling is a 'by-product' wine saved and processed. Generally, if any common joint costs were allocated to by-product wines, a loss on sale would probably result. Hence, it is logical not to allocate any costs up to the point of creation of the 'by-product' wine. Rather, the product is generally assigned a cost of its 'net market value' (estimated sales value less cost to finish and market). In this way a close to 'break-even' will occur upon eventual sale of the by-product wines.

Exhibit 1
Summary of Total Grapes Purchased

	Tons	Cost \$/Ton	Total Cost	Average Cost \$/Ton
Cabernet Sauvignon:				
Adams	110	\$1,000	\$110,000	
Monroe	80	\$800	\$64,000	
"Estate"	10	\$800	\$8,000	
TOTAL	200		\$182,000	\$910
Merlot:				
Jefferson	10	\$850	\$8,500	\$850
Zinfandel:				
Jackson	30	\$400	\$12,000	
Lincoln	10	\$360	\$3,600	
TOTAL	40		\$15,600	\$390
Carignane:				
Adams	30	\$300	\$9,000	
Monroe	20	\$250	\$5,000	
TOTAL	50		\$14,000	\$280
TOTAL	300		\$220,100	

Exhibit 2
Grape Utilization Matrix

Tons of Grapes	Wine	Program		
Grape Variety:	Total Tons	Premium Cabernet Cabernet Blanc	Zinfandel	Red Table Wine
Cabernet	200	190	10	
Merlot	10	10		
Zinfandel	40		30	10
Carignane	50			50
TOTAL	300	200	10	30

Exhibit 3
Physical Inventory of Wines
Wine Program: Cabernet Sauvignon

(Gallons)		Standard Generic Bottling	Bulk Sale	Uncertain	Total
Comment	Premium				
Tank 1		1,500			1,500
Tank 3	6,000				6,000
Tank 4				1,500	1,500
Tank 6 Estate: Reserve	1,500				1,500
Tank 8	6,000				6,000
Tank 9				2,000	2,000
Tank 10 50% Merlot 50% Cabernet	3,000				3,000
Tank 11				1,500	1,500
Tank 12 Heavy Press			3,000		3,000
Tank 14	8,000				8,000
TOTAL	24,500	1,500	3,000	5,000	34,000
Reallocation of Uncertain (60%/40%)	3,000	2,000		(5,000)	—0—
TOTAL	27,500	3,500	3,000	—0—	34,000

Exhibit 4
Value of Grapes Utilized

Grape Variety:	Average Cost \$/Ton	Total Tons	Premium Cabernet Cabernet Blanc	Zinfandel	Red Table Wine
Cabernet	\$910	\$182,000	\$172,900	\$9,100	
Merlot	850	8,500	8,500		
Zinfandel	390	15,600		\$11,700	\$3,900
Carignane	280	14,000			14,000
TOTAL		\$220,100	\$181,400	\$9,100	\$11,700

Wine Cost Allocation

The sequence of recording joint or by-product wine costs is the reverse of what one would expect. The relatively unimportant by-products are usually dealt with first by 'pulling' the net realizable value out of the total grape cost. The balance is then divided or allocated among the joint costs.

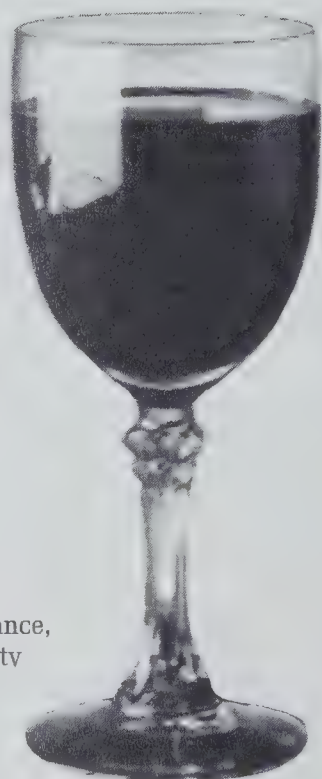
Exhibit 5 illustrates how this seemingly complex, but basically simple, process works. Assuming 2,000 gallons of lees wine was generated from 200 tons of Cabernet Sauvignon and Merlot, and assuming a net realizable value of \$.50/gallon, a lees wine valuation of \$1,000 is removed from the gross grape cost. This leaves \$180,400 to be divided among premium and standard categories.

Simple Average

The simplest cost allocation method is to divide the total grape costs, net of lees valuation, for a wine program by the total gallons produced. For the total of 34,000 gallons of wine in the Premium Cabernet Program, this would result in an equal grape cost of \$5.31/gallon.

Unfortunately, if the 3,000 gallons of Cabernet Sauvignon earmarked for bulk sale is valued at the \$5.31 cost, such a sale at an estimated \$3.00 net realizable value will result in recording of a \$2.31/gal loss. Similarly, the 3,500 gallons of Cabernet Sauvignon designated for generic bottling would be also overvalued relative to its net realizable value of \$3.92/gallon.

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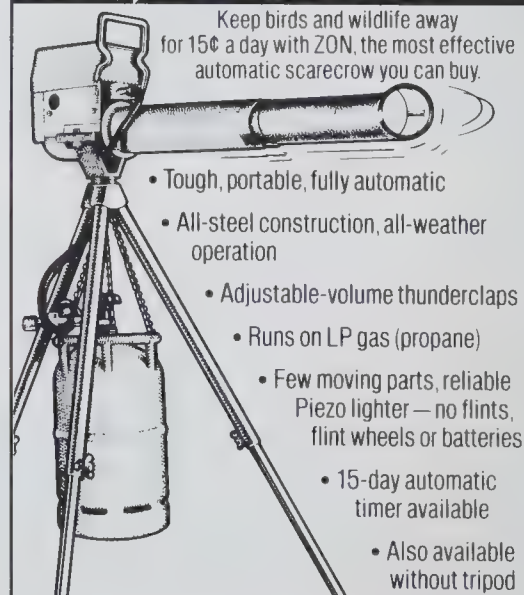
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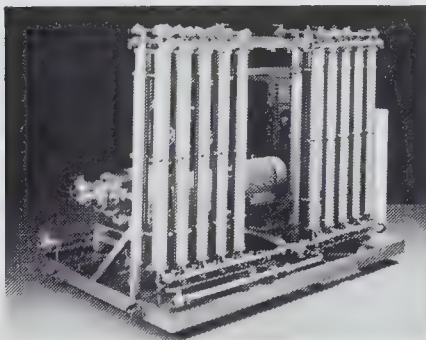
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Exhibit 5
Grape Cost Allocation
Based on Net Realizable Value

Grape Cost for Cabernet Sauvignon Wine Program (Exhibit 3)					\$181,400
Lees Wine Credit (2,000 gallons @ \$.50)					(1,000)
Net Grape Cost					<u>\$180,400</u>
					Total
% of Total Realizable Value (Exhibit 6)	92.2%	4.75%	3.1%	100.0%	
Allocation of Grape Cost	\$166,300	\$8,500	\$5,600	\$180,400	
11/30 Inventory (Exhibit 3)	27,500	3,500	3,000	34,000	
Grape Cost \$/Gallon	\$6.05	\$2.42	\$1.87	\$5.31	

Obviously, an accounting methodology which causes losses to be recognized in an economically and enologically sound operation must be subject to challenge. Some more logical basis of allocation must be sought out.

Weighted Average

Another approach is suggested by examining the winemaking process a little closer. The very best ton of grapes will yield between 20-30% light, medium, and heavy press wines. Even an accountant can taste, see, and smell that medium and heavy press juices are not the same as free run. Moreover, when a significant economic difference is also evidenced, such as separation into potential premium bottling, generic bottling or bulk wine categories, it is inconsistent to apply a uniform unit cost. Clearly, in such cases the better wines should bear more than a pure volume-related cost allocation.

One solution to the 'multi-joint' product problem is to weight the cost allocation on the basis of the value of the wine as well as the gallons. The value component can be defined in several ways, but a common one again is the 'net realizable value'. The allocation methodology using the net realizable value concept for the various Cabernet Sauvignon wines described previously is illustrated in Exhibit 5.

A grape cost allocation which tends to equate profit margins of the wines is the end result. Virtues of the system are objectivity, consistency and relative simplicity. From a logic viewpoint, it may be argued that premium wines ought to have a much higher percentage margin. For those advocates,

Exhibit 6
Net Realizable Value

	Premium Cabernet	Red Table Wine	Bulk Wine	Total
Gross Selling Price \$/Case	\$72.00	\$24.00		
Less Cost to Complete & Market				
Crushing & Aging	15.00	5.00		
Bottling	8.00	6.00		
Marketing @ 15%	9.00	3.60		
Subtotal	32.00	14.60		
Net Realizable Value \$/Case	<u>\$40.00</u>	<u>\$9.40</u>		
Net Realizable Value \$/Gallon	<u>\$9.79</u>	<u>\$3.92</u>	<u>\$3.00</u>	
Inventory (gallons) 11/30	27,500	3,500	3,000	34,000
Total Net Realizable Value	\$269,200	\$13,700	\$9,000	\$291,900
% of Total	<u>92.2%</u>	<u>4.7%</u>	<u>3.1%</u>	<u>100.0%</u>

other weighted averaging bases, such as gross market price, might be more suitable.

Refinements

Several minor problems which can be encountered in calculating unit costs have been glossed over. Generally, common sense resolves most. Use of the November 30 physical inventory to derive a current vintage production volume can be complicated if any prior vintage wines have been blended into the new wines. The winemaker should be requested to provide a listing of all pre-inventory blends. This listing can be checked by reviewing the blend history of all wines which are kept to support appellation and BATF requirements. Once identified, older wines should be deducted from the November 30 new-wine balances.

A reverse problem may exist for current year wines which may already have been blended into prior vintage wines or otherwise used or sold before the inventory date. Again, the winemaker should be asked to provide a detailed listing of all blends or sales using or involving new wines. Once this is obtained, new wines so utilized should be added back to the November 30 inventory so as to adjust the balances to reflect production of all current year wines.

Conclusion

By adapting cost accounting treatments as closely as possible to winemaking procedures, a reasonable estimate of unit grape costs can be developed. Several approaches and various refinements have been presented. The methodology adopted should be primarily a reflection of a winery's operation and philosophy. Allocations are a necessary element in the cost estimating process. However, logic and common sense ought to be the guiding lights.

With grape costs generally comprising over 50% of total wine costs, an important step in development of a standard cost is completed. Absorption of labor and overhead costs involved in crushing, fermenting, processing and ageing is the remaining major element of wine costs to be addressed. A succeeding story will present a methodology for estimating these elements in the standard cost formula.

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Making Fermentation Decisions

Lisa Van de Water

The first month is the most important in a wine's life. Harvesting and fermentation, like birth and childhood, are the foundation of all subsequent development and may determine a wine's fate. Though many fermentation traumas heal, others are irremediable. The decisions of a few hasty moments during the harvest can be the most influential ones in the life of a wine.

This set of guidelines is intended to help winemakers organize their activities to make the most effective use of their time during the hectic crushing season. Not all suggestions will be applicable to every wine, and alternate choices exist that were not included, but the options listed should encourage winemakers to consider the effects of decisions they make.

The three basic recommendations for a successful harvest are:

1. Plan Ahead
2. Pay Attention
3. Be Flexible

Plan Ahead Before any grapes come in, figure out on paper what you plan to do this harvest season. Include all details of wine processing, so some key operation is not missed. Use a checklist so that necessary supplies and equipment are on hand when needed. Ask yourself what problems could arise at each step and how your decisions would change to cope with them. Playing a game called "What would we do if...?" can alleviate panic when some of the disasters actually occur.

When the plans are written, set about to implement them as much as possible beforehand. Order (or culture) yeast & ML bacteria, inventory lab and cellar supplies, clean and repair equipment, locate extra labor. A frantic scramble to obtain forgotten items or to prepare neglected equipment can become a major difficulty at the last minute.

Pay Attention Once everything is planned, keep your eyes and ears open for any indication that your plans might need revision. An especially important aspect is grape arrival dates. Visit the vineyards from which you will receive grapes and use every clue to anticipate what is ahead. Listen to weather predictions and talk to other vintners and growers about ripening patterns.

When the grapes arrive, do not proceed automatically. Check the fruit carefully to be sure it matches your expectations and will fit into your plans. Be continually on the lookout for problems throughout fermentation. Check each must every day by smelling it, tasting it, and testing Brix and temperature. If something goes awry, move to rectify it right away, hiring a consultant with expertise in that area if necessary.

Be on guard at all times, and expect the unexpected. Though it is impossible to prepare for everything that can go wrong, the impact on the wine will be less if it is treated sooner rather than later. More important than predicting events is noticing them once they happen.

Be Flexible Be ready to change your ideas as required. It is as essential to be able to modify a plan as it is to have one in the first place. You may have a perfectly wonderful scheme to make a certain type of wine from a certain batch of grapes, but all that must be revised at a moment's notice if the weather, human error, or other circumstance intervenes.

Whatever the cause, the axiom about the "best-laid plans" remains true. A skillful winemaker will notice when things

go contrary to forecast, changing variables that can be manipulated and adjusting methods to fit variables that cannot.

For example, a winery may have planned to make a full-bodied, rich-tasting red, but rain came, rot set in, and the grapes have to be picked unripe or not at all. One option is to reject the grapes entirely, which might be the choice for the specialty winery making only one type of wine. Some wineries could split the juice into two sections, making one batch into a rosé or blanc de noirs, concentrating the flavor in the other portion by using the skins from the entire lot of grapes. The part to be fermented red would be chaptalized (except in California) to bring the sugar to a level appropriate for a full-bodied wine. Or, a light, fruity red might be made from the grapes by leaving some whole clusters if any were sound, fermenting cool, and preventing ML fermentation by lowering the pH with acid (if above 3.2), treating the must as if it were white after pressing. There are other choices, but the point is that flexibility enables you to make successful wine even if your original plans must be altered.

Also, being aware of the necessity to re-evaluate and update plans will help you notice discrepancies before it is too late. The winery whose Chardonnay grapes were delivered at 18° Brix instead of the promised 23.5° could have made some informed decisions if the people at the crusher had been ready to change their idea of the grapes to match reality.

The following step-by-step walk through the harvest season may help winemakers to put their thoughts in order and to be prepared for this year's crushing adventure.

Before Harvest

1. *Choose type and amount of grapes.* If the grapes are yours, you may need to decide whether to use them, sell them, or possibly 'let them hang' if they are of extremely poor quality. If you will use them no matter what, remain open to adjusting your plans if the grapes do not meet your expectations. Decide what conditions are unacceptable to you and would result in not picking, or in rejection of purchased grapes. Build these conditions into any grape contracts.

If you are purchasing grapes, select varieties and regions appropriate for the style of wine you want to make. Look for a vineyard in a region whose climate is suitable to your desired style. Select grapes whose picking times work logistically for your facility. Try to arrange your winery's overall crushing schedule based on an even spread of expected picking times; plan on a staggered delivery schedule which will maximize your crusher and press without straining your tank capacities. Leave some leeway to allow for slow fermentations and early grapes. Ask the grower to describe the grapes, and talk to winemakers who have purchased them in previous years, making special inquiry about any problems with fermentation. If possible, taste some wines made from the grapes. Request any analysis records of tests that have been done on the grapes in previous years. Specifically discuss pesticide applications, especially those close to harvest.

Check the vineyard in person before making a decision to purchase grapes. If you cannot visit the vineyard, send someone who knows what to look for and who can take pictures for you, even if you have to hire a vineyard consultant.

Make sure there is a clearly worded written contract, checked by a lawyer, even if the grower is a friend or relative (some would say especially in these cases). Many hard feelings (and litigations) could be avoided with a written contract.

2. *Plan on a picking date, updating it as needed.* The picking date should be a mutual decision between winery and grower, based mostly on winemaking considerations, but with attention to other practical realities, such as availability of picking crews. Check the grapes at least once a month as harvest approaches. Look for signs of stress, disease, mold/rot/Botrytis/mildew, over-cropping, uneven ripening, raisining, misidentification of varieties, over-eager spraying, sunburn, etc.

Estimate crop level yourself, independently of the grower, and coordinate your sampling for acidity, pH, and Brix with the grower's to check for sampling consistency. Taste grapes from several parts of the vineyard to check varietal intensity.

Pay close attention to the ripening pattern in the area(s) your grapes will come from. You may be able to approximate more closely your grapes' arrival date in relation to nearby vineyards.

3. *Select yeast strains and decide about ML fermentation.* For each of the wines you plan to make, choose which yeast you want to use to match your style, and estimate how much yeast you will need to handle the largest crop you could expect. Tentatively decide whether or not you will encourage malolactic fermentation (MLF) in each of the wines, paying attention to variety and expected pH. If there are any grapes for which this decision cannot be made ahead of time, order (or prepare) ML bacteria for them anyway, as it will be too late to order once the grapes arrive.

Order (or prepare) yeast and ML bacteria in enough time so that they are on hand one week before the earliest possible picking date for each batch. Even throwing out some cultures that become too old is preferable to being caught short. Keep

on hand one or two types of dry yeast, even if you plan on using liquid yeast, in case other yeasts do not arrive in time or the starter does not grow quickly enough.

Many winemakers start building up their ML bacteria several months ahead of time, using some must picked for the purpose. The pH can be adjusted to 3.5 or higher, and apple juice may be added, to encourage the ML bacteria to grow in the starter.

Enough yeast nutrient should be available to add to any juice that might not ferment dry because of a nutrient deficiency. Nutrients work best when added BEFORE fermentation, so it is important to know the vineyard history.

4. *Make any remaining decisions about equipment or physical layout.* Check that all barrels on hand are in good condition and schedule preparation (soaking-up) of new barrels. If more barrels are needed, order them before harvest begins, or decide what to do if you need cooperage in a hurry. If there is equipment that has not arrived, make detailed plans for its arrival to avoid confusion or mistakes. Also make contingency plans in case its arrival is late.

Walk through the winery, mentally (or sketching on paper) following the routes that new grapes will travel in their journey through fermentation and into the winter. Check for gaps in the winery's ability to process grapes efficiently and smoothly, note any potential trouble spots, and order extras of common cellar items (such as plastic buckets or chlorine disinfectant) that may slow production if they are in short supply.

Determine which grapes will go into which fermentation containers, be it barrels or tanks. Prepare some contingency



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plans in case more (or less) must be processed than expected; sometimes tonnage estimates are greatly in error.

Inventory the labware, lab chemicals, and winery chemicals to determine what is required. All standardized lab chemicals should be replaced at least once each year, and winery chemicals such as potassium metabisulfite must be replaced when they have been exposed to dampness or air. Critical labware should be ordered at least one month before it is needed, since labware manufacturers often run out of essential items such as pH meters during harvest. Determine which lab analysis needs to be done and when during the vinification process.

Make sure that all employees are trained and that they understand their responsibilities and authority. If there is some operation that did not work in the previous harvest, think of the best remedy possible for the problem and, if possible, try it out ahead of time. If you change some procedures (such as switching from tank to barrel fermentation), plan all the details before the grapes arrive. If possible, buy some inexpensive grapes to test your systems. At least one winery obtains inexpensive table grapes with which to check all new and old equipment before their 'real' grapes arrive.

Make sure all machinery is operating and in good condition; repair if necessary. Check for corrosion, leakage, or other damage caused by nearly a year of inactivity. Take pumps apart, look for cracks in hoses, oil all moving parts. Replace small items like gaskets, even if not worn, that could cause trouble if they broke during harvest. Mechanical failure is the cause of some of the most heartrending stories at large and small wineries alike.

At Harvest

5. *Re-evaluate your planned course of action.* When grapes arrive, make sure that the style of wine you have planned to make is still appropriate to the grapes. Test titratable acid, sugar, pH, and possibly berry weight; examine the grapes for raisins, mold, or other defects that could change your mind about how to proceed.

If grapes are not suited for a full-bodied red, make carbonic maceration wine, rose, blanc de noirs, or even sparkling (if they are really unripe). Unripe white grapes should be considered for sparkling wine. Chaptalization (if legal) may be the answer to a load of grapes that come in with a lower sugar content than desired. Sugar addition cannot add ripeness however, so taste the grapes for varietal flavor to see if they have enough intensity to make the desired type of wine.

Blending (the great equalizer) can be the saving grace for a winery faced with grapes that are not ideal by themselves. The right blend of either two or more wines in large percentage or small proportion can produce one highly successful wine from a number of unbalanced ones. No matter how outrageous your blending ideas, taste them in the lab just to see what happens. You should consider the stability of each component at the time of blending. Blending remains an option throughout the life of the wine, but can start at the crusher.

6. *Adjust juice if necessary.* The impact of desiccated berries or botrytis should be determined. Sweeten the juice if the sugar is too low for your purposes. Chaptalization is legal in most of the U.S. but is illegal in California for commercial producers. Overripe grapes can be diluted before fermentation to



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reduce the sugar content. In California, amelioration of "sound ripe" grapes is not permitted, though "excessively dehydrated" grapes may legally be diluted to not lower than 22° Brix before fermentation begins. Of course, California producers generally have more problems with overripe fruit due to a long, sunny growing season.

The Brix at crushing is often lower than the actual sugar content of Zinfandel grapes, especially when there are raisins among the berries. Periodic Brix measurements of freshly-crushed Zinfandel gives the rate of Brix increase, which helps in estimating the sugar contribution that will be made during fermentation by dehydrated berries.

Some commonly preferred sugar levels are summarized below, but individual ideas vary:

- sparkling wine 17-19° Brix
- carbonic maceration 20-21°
- white, light 19-21°
- white, full-bodied 22-24°
- white, sweet 20-30° and above
- red, light 21-22°
- red, full-bodied 22-24°

Juice over 24° Brix should be diluted unless high-alcohol and/or sweet wine is desired.

Measure pH. If total acidity is too high but pH is also high, adjust on the basis of pH anyway, as tartrate crystals will be deposited during fermentation and cold stabilization, thus removing excess acid. If the pH is OK but the total acidity is too low in your estimation, be cautious in making acid additions, watching to see that the pH does not go too low.

If ML fermentation is planned, acid additions that would bring reds below 3.4 and whites below 3.3 are better per-

formed after MLF has completed, for grapes from most California regions. Other areas which do not have as much difficulty with MLF should use their own guidelines for pH adjustment in wines destined for MLF.

Acid adjustments other than citric are best when made as early as possible in the life of the wine. If you are not sure the acidity needs adjusting, wait until you are sure, but do not delay needlessly. Tartaric and malic acid (if the wine will not undergo MLF, malic acid may be chosen) can be added before fermentation. Citric, if used, is added later to prevent its metabolism into spoilage components.

7. *Check your yeast and ML decisions and prepare starters.* On the basis of the adjusted pH and the style of wine you wish to make, decide whether or not the must will be inoculated for MLF. Remember that unless you are prepared to sterile-filter the wine or add fumaric acid, the pH will be the major factor determining whether or not the wine will undergo MLF.

If the ML decision is yes, add no more than 50 ppm SO₂ at crusher (or better yet, ferment without SO₂), and keep the wine warm after alcoholic fermentation until MLF is finished, or until you give up for the winter. No SO₂ should be added until MLF is completed, once the juice has begun yeast fermentation.

If the ML decision is no, add 60-100 ppm SO₂ at crusher, keep wine cold after fermentation, and add SO₂ to bring the wine to about 0.8 ppm molecular SO₂ (see SO₂/pH chart to determine the free SO₂ needed) as soon as the wine is completely dry or has been stopped while sweet. Do not put the wine into wooden containers that have held wine that underwent MLF. Be prepared to change your tactics if the wine enters MLF spontaneously.



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Bordeaux - 375ml, 750ml, 1.5L, 3.0L, 5.0L, 6.0L

Burgundy - 375ml, 750ml, 1.5L, 3.0L, 5.0L

Hock - 375ml, 750ml, 1.5L



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Review your yeast decisions to make sure they are still appropriate for the fruit's condition upon arrival at the winery. Make any changes needed as a result of adjustment of plans for the grapes. For example, if you decide to make blanc de noirs from grapes initially destined to be a full-bodied red but picked unripe, you may want to use a different yeast than the one you originally selected.

Begin preparing any necessary starters in time to inoculate the juice soon after crushing. Yeast starters may be set up a few days ahead, using almost any appropriately colored juice (even table grape juice is OK). ML bacteria starters need more planning, as they require several days or more between transfers. A winery that can start them growing in must before the juice arrives has a head start that can be the deciding factor in the success or failure of the inoculation. The must for an ML starter should be adjusted to at least 3.5.

8. *Calculation of SO₂ addition.* Fermenting without SO₂ is becoming popular among some white wine producers. For this method to be successful, no SO₂ at all may be added until the first racking. If skin contact is desired for whites with no SO₂, keep the juice temperature cool. After pressing, settle and rack the juice if desired, and aerate it before fermentation (it will turn an ugly brown). Ferment cool (usually under 65°F) and keep the temperature down after fermentation. Gas any minimal headspace with CO₂ at least every other day, if the fermentation isn't strong enough to generate its own CO₂ blanket. DO NOT use the no-SO₂ method if your fermenters cannot be topped as soon as fermentation slows down (or use variable capacity tanks), or if you have no temperature control in a hot climate.

If you add SO₂, put 40-50 ppm in must, red or white, destined for ML. To musts not intended to undergo MLF, add 60-100 ppm. If fruit is rotten or moldy, it is often better to get the fruit off the skins immediately, even if it means not making the style of wine you planned on, rather than adding an excess of SO₂.

The more SO₂ added before fermentation, the more acetaldehyde (sherry-like smell) is produced by the yeasts. This compound binds with SO₂, keeping it in the wine forever. Wines with high bound SO₂ have a chemical taste in the finish, so it is important to keep the total SO₂ level down, under 100 ppm at bottling if possible. If too much SO₂ (over 100 ppm) is added at the crusher, even though much of it is lost in the fermentation lees, more than is desirable will remain in the wine as bound SO₂.

9. *Decide on juice treatment options.* The more time suitable white juice remains in contact with skins, the fuller-bodied, more complex, more intensely varietal, and less simple-fruity it might become. Whether this is desirable or not is a style decision; there is no right or wrong way. Most winemakers soak only Chardonnay, for an average of 4-12 hours if given any skin contact at all, but the time can extend to 24 hours or more. One white variety that should not spend any time on the skins is Gewurztraminer, because of its pinking tendency, unless a light 'blush' is acceptable. Allowing a white to ferment on its skins, instead of just soaking before yeast is added, is generally considered to be a mistake rather than a style option.

Red juices may pick up more color if soaked on the skins before yeast inoculation. If more color is desired, and you

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have tank space, soaking may be appropriate for your grapes. Keep the temperature below 70°F, and watch for signs of spontaneous fermentation (inoculate the juice immediately if bubbles appear). Stir the juice as often as you can while it soaks, for maximum color.

Hot pressing, another red juice option, results in intense color without much tannin by heating red juice to 140-160°F for less than an hour, in the presence of a special color-extraction pectic enzyme. The juice is then pressed and fermented without skins.

Whole berries would seem to do the same job as skins, but they have a very different effect. If you leave some (10-25%) whole, uncrushed berries in red must as it ferments, they do a 'carbonic' fermentation inside the grapes, giving a charming fruitiness to the wine after it is pressed. The wine is also lower in alcohol than would be expected from a conventional fermentation. Many wineries, especially in France, leave some whole grapes in wines like Pinot Noir, which often could use a little more fruit character. The berries can be a nuisance while draining and pressing, but they are frequently worth the trouble.

Leaving a certain percentage of stems in red must is another option. Stems add tannin to musts that are normally deficient, such as Pinot Noir or Gamay. Stems can be left loose throughout the fermentation, or they can be suspended in the must in a nylon mesh bag for easy removal when the tannin pick-up is sufficient, if your pump cannot handle stems. Heavy red wines do not seem to benefit from the presence of stems.

Pectic enzyme is another choice to be made at the crusher. Many non-Vinifera and non-grape juices, as well as some Vinifera varieties, benefit from pectinase addition. Pectic

enzyme is particularly useful in stone fruits to break down pulp. For many grapes, pectinases aid in pressing and result in slightly increased yields (a few more gallons per ton), which may or may not be significant for the premium wine producer.

Yeast nutrient additions are most effective when added before fermentation begins, while the yeasts are in their initial growth phase. Nutrients are often added as a matter of course to juices, such as Chardonnay, that tend not to ferment to dryness. If a fermentation is to be stopped while the wine is sweet, nutrients should not be used.

10. *Press and select press fraction blends (white, rose, blanc de noirs).* White grapes are pressed before fermentation, either immediately after crushing or after desired skin contact. Though you might keep the free run, first press fraction, and heavy press separate, the choice in many wineries is to blend the free run and light press fraction together before fermentation, saving the heavy press for remedial treatment or sale in bulk. Studies have shown that blending before fermentation begins is often preferable to blending afterwards, though the difference is slight.

Rosé is made by allowing the grapes to soak on the skins to extract some of the red color; how long they soak depends on the preferred color and the intensity of color in the grape-skins. To make a medium-pink rosé, grapes like ripe Zinfandel need less than an hour of skin contact, but if the grapes are not highly colored the rosé may need to ferment on the skins a short while to pick up enough color. Blending of rosé press fractions is usually done on the basis of color, with fractions that are too red going into a red wine.

To make a light-colored blanc de noirs or sparkling wine, the grapes must be cold at the moment of crushing, and cannot be very ripe. The free run is allowed to drain immediately instead of pressing it. Since press wine is almost always too red for such wines, the drained skins may be included in a red wine fermentation without pressing, or pressed for rosé.

11. *Settle and rack pressed juice and use lees filter if desired (white, etc.).* Pressed white juice is often settled overnight in a cooled tank and racked off lees the next day. This helps to remove leftover sulfur dust particles because they sink, and is considered beneficial to the juice in eliminating coarse solids as well. Potential trouble can occur when winemakers rack the juice off too clean, so it has difficulty fermenting, since yeasts need a certain amount of solids for optimum growth.

Some wineries have found that they prefer to settle the juice, then rack into a fermenter all but the very bottom sludge in the settling tank. This sludge (which should be no more than 5% of total volume) can be fermented separately but is most often thrown away as useless unless it is filtered through a lees filter and returned to the main fermenter. A lees filter can salvage expensive juice that otherwise might be discarded.

Centrifugation is another option in juice clarification. The machine can be set so that enough solids are retained for the yeasts. Wineries already owning a centrifuge are likely to use it often on juice, but a winery without one should consider carefully whether a centrifuge or a lees filter (or both) would best suit their needs.

Whether filtered or not, the juice should retain at least 1-2% solids, or the yeasts may not be able to ferment vigorously enough to complete the fermentation in low-nutrient juice such as Chardonnay.

During Fermentation

12. *Determine fermentation temperature.* With cooler fermentation temperatures, a lighter, fruitier, fresher, and more aromatic wine can be produced. With a warmer fermentation, the

continued on page 59



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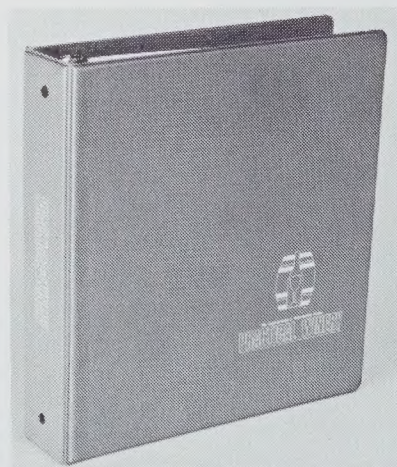
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fuller, more complex, and less fruity the wine becomes. The choice is a style decision. Common temperatures for whites are 50-60°F, or 60-70° for wines fermented in barrels; for reds, 70-90°. Full-bodied reds need to have a temperature 'spike' in which they achieve 85° or higher at the peak of fermentation, if only for a few hours, to extract maximum flavor. It is common practice to ferment some Pinot Noirs at around 90°, but allowing must to exceed 90° may kill or retard the yeasts.

An exception to the warm fermentation temperatures discussed above is wine like high-sugar Zinfandel, which has excessive color and flavor and needs to retain as much fruit as possible. Such reds should be fermented in the low 60°s to preserve fruitiness, unless a port style is wanted.

Late-harvest-type whites may be fermented long and slowly at a cold (35-45°F) temperature to encourage glycerin formation and to preserve fruitiness. Such fermentations may take months.

Alcohol content is influenced by fermentation temperature. The classic '0.55 times sugar' is only an average, with individual numbers ranging from 0.52 to 0.60 or even higher. Wines fermented warm in open containers develop less alcohol per degree of sugar than those fermented in closed containers at a cool temperature.

13. *Determine the timing and mechanics of cap management (reds).* If skins are still present during fermentation, they need to be mixed with the must as often as possible during the first couple of days for greatest color extraction. After that time, many wineries do it only twice a day.

Physically punching down the mass of floating skins to resubmerge them is favored by many over the pump-over method, which uses a stream of wine from a recirculating hose to break up the cap and mix the must. Which method is used, however, usually depends on the size and logistics of the tank. Either mechanical method is preferable to a submerged cap as far as degree of mixing is concerned, though a submerged cap provides better mixing than leaving the skins to float undisturbed and dry out.

Warm fermentations must be watched closely to be sure that no acetic acid forms in the cap, as it could spoil the wine. An acetone aroma may develop in reds before fermentation and will disappear when the yeasts become active, but a vinegary or solvent smell from a fermenting cap can mean acetic spoilage. Scoop off as much of the cap's surface as you can if it occurs, to avoid infusing even more spoilage components into the wine.

14. *Schedule rackings and finings of musts (with no skins present).* Some winemakers stir tanks of white wine near the end of fermentation to encourage completion. Others rack off the lees at 10-12° Brix, though fermenting wine is not easy to rack. Some white wines are allowed to finish fermenting in small wooden cooperage, being racked into barrels at some point during the fermentation. Racking below 5° Brix, but before complete dryness, may arrest the yeast activity, and they may not start again. If for some reason a wine must be moved when there is very little sugar remaining, stir the lees and rack them along with the wine into the new container, rather than leaving the yeasts behind.

Adding bentonite (usually 1-2 lb/1,000 gal) during fermentation is done occasionally, again before the wine reaches 5° Brix. The lees should be stirred periodically toward the end of fermentation so the yeast does not become compacted and inactive on the bottom until the wine is dry.

If the fermentation becomes very slow and threatens to stop before the wine is dry, some recommendations include warming the must to 65°F, adding a large amount of a vigorous dry yeast plus yeast nutrient, stirring the lees, and

adding some vigorously fermenting must. The longer a 'sticking' fermentation is ignored, the less the likelihood of successful treatment. No SO₂ should be added, nor should the wine be chilled, until it is dry.

If a sweet wine is desired, chill, rack, add SO₂, and fine, centrifuge, or filter with a lees filter to remove the yeasts. There is always the danger of refermentation until the wine is sterile-filtered or sorbate is added (which should not go in until just before bottling), so new wine must be kept cold and clear.

15. *Press and blend fractions (musts with skins present).* Red wines may be pressed whenever the tannin or color reaches an acceptable level. Many reds are pressed in the last 1 or 2° Brix, but they may be pressed at any time if they start to become too tannic, or if a lighter style is preferred.

Though white wines should not be racked towards the end of fermentation, pressing red wine at that point is all right because the skins give them a different nutrient balance, and because pressing does not remove the major part of the yeast population, as does racking off lees. Pressed reds should not be racked until dryness, or they too may 'stick'.

Leaving red wine to soak on the skins after dryness is favored by some wineries who want a robust, tannic wine. The wine may be circulated for greater contact with the skins, or may be allowed to rest and settle, in the week or two after fermentation ceases. The tannin will rise for a time as the wine soaks on the skins, but then the level will drop slightly as the tannins form complexes.

Carbonic maceration fermentations are usually pressed after a pre-determined drop in Brix, frequently after about a week. Grapes need not be crushed first, but may go straight into the press. It is a very messy and patience-trying operation. Pressed must plus pied-de-cuvé (free run from the bottom of the tank) is often about 8-10° Brix at pressing, if the carbonic part was successful.

16. *Racking and adjustment after dryness (if necessary).* Determine dryness by chemical test, not hydrometer. Dextrocheck may be used for a quick assessment of dryness, though Lane/Eynon, Gold Coast, or enzymatic method (fermentable sugars) should be the definitive analysis. Reds are dry when their residual sugar (by a copper-based test) is 0.2% or lower, whites when they reach 0.1-0.15%. The °Brix will be a negative number, the specific gravity less than 1.000.

Wines that are not intended for MLF should have an SO₂ addition, usually around 40-50 ppm. Wines destined for MLF cannot have an SO₂ addition until MLF is completed, and they should be kept above 60°F to encourage the bacteria.

Check pH and acidity, and adjust if the pH is too high (bring down to 3.3 for white, 3.5 for red, with tartaric acid, unless the total acidity is exceptionally high already, or if the total acidity is obviously too low). If the acidity is much too high, and the pH too low for MLF, adjustments with carbonate (calcium or potassium) may be the best course. Each situation must be reviewed individually.

A racking schedule is decided on the basis of style, ML involvement, potential spoilage and logistical considerations like container availability. Some wineries prefer to leave wine on the lees to increase complexity, while others clean wines up quickly. If wine begins to form H₂S (rotten-egg smell), it should be racked immediately, even if contrary to style decisions.

The decisions do not stop at the end of fermentation, of course. Throughout cellaring are choices about oak, additions, blending, fining, filtration, etc. The art of winemaking is found in the small ways that wines are shepherded toward preferred attributes and away from unwanted ones. With practice, even the harvest can become like a dance jointly choreographed by human and grape.

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